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THE WATERS OF WESTERN INDIA.

PART IV.—GUJARAT.

(By a Member of the Society.)

FROM the Konkan northwards to the tropic of Cancer lies the province of Gujarat, bounded on the east, at first by the northern extremity of the Sahyadris, up to the Kondai Bari Pass. Just north of this, the last elbow of the chain turns sharply eastwards to form the plateau of Nizampur; and for about 25 miles, as the crow flies, the boundary between Gujarat and Khandesh in the valley of the Tapti is an imaginary line. I am here using "Khandesh" as a Geographical expression only. Politically it extends some miles to the westward in a country called the Nowapur Peta. But the most convenient physical boundary mark is the "Haran-pal" (or "Buck's leap") on the Tapti; the more so as we are here dealing with water. This is a rock barrier over which the river forms a cascade in fine weather, though in flood it is said to be merely a rapid.

All the waters of Khandesh proper pass over this fall, no matter where they come from; but the district officially called Khandesh has some outlying villages on the Deccan plateau, draining into the Godavari, and also includes a tract called the Akráni Pargana in the valley of the Nerbudda (Narmada).

The Nerbudda also has its "Haran-pal" corresponding to that of the Tapti; and an imaginary line drawn through the Satpura

Mountains between the two will serve for a prolongation of our eastern boundary, and may fairly be protracted through the western branches of the Vindhya to the tropic of Cancer.

This last makes an excellent northern limit to a province which has none precisely defined by nature; and it happens, too, to coincide very well with the northernmost limits of British Gujarat; and the points at which the rugged country to the east and the plains to the west begin to show the characters in man, beast, and soil of Rajputana. The Deccan trap in the hills begins here to give way to other formations; and the plains assume more and more the character of the Indian Desert. I am aware that some naturalists have recently included the Deesa region, and even country much further north, as Gujarat—chiefly, it would seem, because the Bombay Army has garrisons there. An ideal boundary for an ornithologist would perhaps be the death-scene of the northernmost Painted Francolin and southern green pigeon (*Crocopus chlorigaster*); but the tropic is, on the whole, the best boundary, and coincides pretty closely with those of native geography and ordinary English conversation.

To the west of Gujarat proper lie the Peninsulas of Kattywar and Kutch, which, in geology, flora, and fauna, may be assigned to the desert region, with the south-western parts of the Ahmedabad District such as Gogo, where we get tertiary fossils on Piram Island. To the south of these lies a shallow and sandy sea, prolonged, east of them, into the Gulf of Cambay. In the rains, when the great and little "Rans" of Kutch fill and communicate with the "Nal" of Viramgaun, and this again with the Gulf, no doubt the fleets of the Royal Canoe Club might circumnavigate them to this day.

Gujarat proper, as I have defined it, has two very well marked regions. Under the hills it is broken and wooded, drained by small rocky streams which run nearly dry in the hot weather. In the extreme south, indeed, there is no marked line between Gujarat and the Konkan, but here begins a plain, which gradually widens, between the wooded hill country and the sea. The rivers, especially those rising in the western ghâts, resemble (while in the rough ground) the streams of the Konkan. But at Surat we come upon the Tapti and at Broach upon the Nerbudda, both members of the second class of Indian rivers and already great perennial streams when they enter this province. North of these we have the Mahi and Sabarmati—streams far inferior to them, but

still respectable—and all four flow for a great part of their course in wide sandy channels between high alluvial banks, as much resembling in appearance the great river-beds of the Deccan as their local tributaries and lesser neighbours do those of the Konkan.

All four are subject to violent floods; and once they top their banks, the flat nature of the country lays it a good deal at their mercy.

The great characteristic of the waters of Gujarat, however, is that its plain is, especially to the northward, a country of *tanks*. The rainfall (which in the hills is high, reaching 100 inches, and probably much exceeding that on some hill tops) is here moderate, and the great thickness of the alluvial soil often makes it impossible to get water in a well of reasonable depth.

The natural remedy is found in tanks, and it will make my later remarks clearer if I describe a typical Gujarat tank. Where the ground slopes sufficiently for the water to know which way to run (which is not always the case), a great crescent-shaped ditch is dug with its horns, of course, pointing against the stream and the convex side downwards. The earth out of this is thrown out on the outer or convex side, and forms an embankment of which the crest ought to be perfectly level tapering in thickness towards each horn; and if the measurements are true, meeting the natural slope of the ground at the points. As the greatest pressure is expected on the centre of the crescent, this is naturally the most massive part of the dam; and that part of the trench which is its ballast-pit will naturally be widest and deepest. But, besides this, ambitious engineers in old days went on digging on the inside of their trench long after the dam was big enough, throwing up the spoil into hills, often into islands, some of them quite high enough to be conspicuous from afar in so flat a country. Such mounds are apt to be crowned with a Hindu temple or Musalman tomb, having usually a few trees around it, and, when isolated, are naturally very favourite spots with waterfowl and crocodiles on account of their safety from disturbance. I have here described a large first-class tank, which would have 30 acres or upwards of water when full. There are many such, and more modest ponds are innumerable in the northern plains. These are so liable to inundation that, in practice, at least once a year, a fish can change his quarters in almost any direction he pleases, following drainage channels which, in the dry season, can only be detected by careful survey.

When full, such a tank as I have mentioned is of course a half-disc of water; and as it dries, this becomes more and more crescentic, till, when the water is near the original level of the soil, the undug centre is a marsh surrounded by a crescent of deep water. This is the best time for water-fowl, the waders taking up their quarters in the marshy central promontory while the swimmers feed around its shore, and especially in the horns of the crescent. During the heat of the day they will sit upon its point or, if there be an island, around that, or float quietly in the centre of the widest water.

It will be seen at once that on such a lake the best point for stalking a flock will probably be at each horn of the embankment; but, once the birds are up and flying about, the points of vantage are on the internal promontory and islands, if any.

The angler's best place, on the contrary, is in the centre of the outer curve of the water and inner curve of the dam, as there the water is deepest and there will be the biggest fish.

If, as often happens, one is encamped upon the tank, this is all very convenient, as the best trees are sure to be at the outside of the centre of the crescent which has the most permanent water-supply. On very large and old tanks the embankment is often well planted at this point. Now, it is pleasant to fish near the tents, but better to shoot out of range of them. It may here be remarked that if the camping ground is S.-W. of a large tank, it is often dangerous in the cold weather (especially for women and children). The cold land wind, blowing over shallow water and marsh, seems to strike deadly chill; and if one must camp in such a place, the north face of every tent should be carefully closed pretty early in the evening, and extra precautions taken in the matter of clothing and bedding.

Such a camp, if one is not inclined to shoot near the tents, gives in any province great opportunities for watching the birds with the help of a good glass. They get pretty well accustomed to natives and cattle, and, after a day or two, to the tents.

I have often been able to watch the coots, jacanas, sand-pipers, and towards the end of the cold weather, snipe, at very close quarters; and the other day I had a painted and a "full" snipe together in the focus of my glasses for 15 minutes, within 20 paces. The difference in their practice is noticeable, the painted snipe feeding in the water a few inches from the mud and the "full" snipe in

the mud a few inches from the water. Both "dibbled" in the mud for a perceptible time, making repeated strokes without quite withdrawing the bill. * The sand-pipers, on the other hand, feed equally in the water and in the mud, but they peck once only, withdrawing the bill immediately with a very rapid motion and elevating it to swallow almost as quickly, something like a hen drinking.

I focussed lately a group of two spotted sand-pipers and a bronze winged jacana, which was lovely to see, the brilliant metallic colours of the latter fairly blazing in the tropic morning and his somewhat clumsy figure contrasting strongly with the graceful forms and quiet colouration of the sand-pipers. The one looked like some Japanese work in two or three metals; the other two like a sketch by some quiet European artist.

Besides the tanks we have (here alone in Western India) numerous natural lakes, not widely distributed, but gathered in groups here and there in the north.

The largest, the "Nal" of Viramgaum, has nine miles by nearly six of open water in December, and an equal area of marsh. It is brackish, but not too much so for freshwater fish, and it is a very paradise of water-fowl. The water is nowhere much more than six feet deep, generally much less, which is all in their favour, but causes a nasty little sea to get up quickly, the more so as the low desert shores afford no shelter.

The islands are mostly wooded with acacias 15 or 18 feet high, enough to cut a figure in such a country. About 35 miles north of this are some salt lakes or marshes, much smaller and chiefly remarkable as great roosting places for wild-fowl.

Again, 100 miles away in the north-east are the lakes of Parantej, beginning with the "Bokh," an ancient river-bed now appearing as a huge trough in the plain, with a string of pools down its centre. The largest of these, the "Great Bokh," is of about 140 acres, if I recollect right, and the next, the "Little Bokh," of 80; but I have no details here. There are several smaller pools, and they swarm with fish and fowl.

A group of smaller pools lies within a few miles of Parantej, east of the Hathmati canal, and another, near Dehgaum, in the Gaekwar's country, north of the direct road from Ahmadabad to Harsol. The

* Note.—"Full" snipe, when quietly put up under these circumstances, often rise silently, without the usual alarm-note, and with little or no "twist" in their flight.

largest is between Harsol and Morasa, and is said to consist of 360 lakelets. I shouldn't wonder if there were really more, but not one of them is itself of any great size. The Khara Lake, which is the largest, may have an area of nearly 100 acres in the rains, but is nowhere 6 feet deep.

NOTE ON *HESTIA MALABARICA*.

BY CAPT. T. MACPHERSON, B.O. S.C.

As nothing is known regarding the early history of *Hestia Malabarica*, it may interest members of the Natural History Society to learn that I have succeeded in rearing it from the eggs. On the 28th of February last, I was in Camp at Devimani on the Kanara Ghauts. On the afternoon of that day, whilst walking through a patch of evergreen forest, I noticed a ♀ *Hestia*, apparently intent on finding a place to deposit her eggs. I therefore stood still and watched her. She fluttered about for a considerable time round a tree that was thickly covered by a creeper with large cordate leaves. At last when I was almost tired of watching her, she settled on one of these leaves and deposited an egg on the under surface. This I quickly secured, and on a careful examination of a number of other leaves of the same plant I discovered some 8 or 10 more freshly deposited eggs (I give illustrations of the egg, the full grown grub and the pupa). The egg is always deposited singly on the under surface of the leaf; it is white, oval, about $\frac{1}{16}$ inch long by $\frac{1}{32}$ broad, attached to the leaf by one of the small ends and marked with about 22 longitudinal rows of hexagonal indentations. The eggs hatched out in from 6 to 7 days, and about 2 days before the grub emerged its black head could be distinctly seen through the thin shell. The larva emerges from a little to one side of the apex of the egg, eating only a small hole sufficient for its exit; it then eats its cast off shell for its first meal.

On emerging the grub is about $\frac{5}{16}$ inch long, skin transparent pale yellow, head and feet black, and through the skin are visible the white rings of the more mature grub, also the two black dots on the back of the 2nd segment. It has 4 minute pairs of fleshy tentacles arranged as in the more mature grub.

In a few days the first skin is cast and the grub then assumes the colours and markings which it retains until it changes to pupa. It eats its cast skin in the first two changes only.

The young grub has the peculiar habit of eating holes in the centre of the leaf instead of from the margin inwards, as with most caterpillars, but this habit it gives up as it increases in size. It conceals itself generally on the under surface of the leaf. In from 20 to 25 days it attains to full size, and is then about 2 inches long by $\frac{1}{4}$ inch broad at the centre, cylindrical, slightly tapering towards the extremities, provided with 4 pairs of black fleshy tentacles about $\frac{1}{4}$ inch long, one pair being on each of the following segments—3, 4, 6, and 12, skin smooth, glossy, head black, 2nd segment white with two small black dots on the back; all the other segments white with a broad band of black round the centre of each; legs black. Segments 6, 7, 8, 9, 10, and 11 have on each side on the black ground small round patches of bright scarlet, particularly distinct on the 6th and 11th segments; belly black.

On attaining its full size the grub spins a small pad of silk on the under surface of a leaf, attaching its last pair of legs firmly to this pad and hanging thus freely suspended head downwards; it remains thus for about 24 hours, when it casts its skin and changes to pupa.

The pupa is naked, hanging freely suspended from its oval segment as in all the Nymphalidæ; it is 1 inch long by $\frac{7}{16}$ broad; colour golden yellow, with large patches of bright metallic gold, the black spots on the wings of the butterfly showing through the yellow parts of the chrysalis.

In 12 or 13 days the pupa loses its brilliant colouring and metallic lustre and turns black, and about 24 hours later the butterfly emerges.

I have given a few specimens of the pupa to the Natural History Society, so that if my description is faulty it can be corrected.

The food-plant I was unable to define, but I left some leaves with the Society, and perhaps they have been classed by this time. The creeper was unfortunately not in flower, nor could I find any seeds.

OBSERVATIONS ON THE FEEDING, &c., OF THE
INDIAN ROCK SNAKE (*PYTHON MOLURUS*)
KEPT IN THE SOCIETY'S ROOMS,

From 27th May 1886 to 20th May 1887.

By H. M. PHIPSON, C.M.Z.S., HON. SEC., B. NAT. HIST. SOC.

THE following particulars, showing the amount of food consumed by the Python in the Society's Rooms in one year with the varia-

tions of its temperature during the period of hybernation and other details will, I think, be of interest to the members.

During the twelve months between 27th May 1886 and 20th May 1887, the snake ate 25 rats, 3 hens, 3 crows, and 1 kestrel, all of which were given to it alive. It is worthy of note that the rats on being placed in the cage appeared to take little or no notice of the snake. They would frequently run over its coils in their efforts to find a way out of the cage, and on occasions, when the snake remained quiet for a time, they would frequently approach it, smell it, and even bite it. The hens appeared to have even less instinctive fear of the snake, and would, if left to themselves for a short time, commence scratching and picking up grains in the cage. The crows, on the other hand, showed considerable apprehension of the danger.

It will be seen that during the hot months the period of digestion averaged about eight days, whereas in the cold weather it became much slower, the two rats eaten on 21st December being retained until 28th February.

During the cold weather, from 21st December to 13th April, a period of 113 days, the snake refused food and remained in a very sluggish, sleepy condition. During this period of hybernation the temperature of the reptile fell from 82° (normal) to 73°, a fall of 9 degrees. Taking the temperature was a matter of considerable difficulty. The snake is very strong, and it often required as many as six persons to hold it still while the thermometer was inserted. The results are, however, of particular value, as such observations cannot be made in European menageries, where artificial heat has to be used.

The snake cast its slough four times during the course of the year: three times in the hot weather, at intervals of 2 months, and once after it had recovered from its hybernation.

Date when Fed.	Description of Food.	Date of Defecation.	Date of Casting Slough.	Temperature taken.	Temperature.
1886.		1886.	1886.	1886.	
27th May	1 Kestrel	3rd June ...	27th May ...	.....
7th June	1 Rat	12th June ...	.....	.....
22nd „	1 Crow	29th June ...	.....	.....
25th „	1 Rat	17th July ...	17th July.....	.....
28th „	3 Rats	1st August.	.....	.....
20th July	1 Rat.....				
27th „	1 Rat.....				

Date when Fed.	Description of Food.	Date of Defecation.	Date of Casting Slough.	Temperature taken.	Temperature.
1886.		1886.	1886.	1886.	
28th July	1 Crow	6th August..	.....	.....
29th „	1 Crow				
2nd August...	1 Rat.....	22nd August.	.....	.....
4th „	1 Rat.....				
6th „	1 Rat.....				
26th „	1 Rat.....	2nd Sept. ...	.....	.....
30th „	1 Rat.....	27th Sept. ...	27th Sept. ...	.....
10th September	1 Rat.....				
28th „	1 Rat.....	14th October.	.....	.....
13th October...	1 Hen	2nd Nov. ...	.....	.....
21st „	1 Rat.....				
30th „	1 Hen	27th Dec. ...	.....	9th Nov.	82 °
8th November	1 Rat.....			28th ..	79½°
17th December.	1 Rat.....				
19th „	1 Rat.....	1887.			
21st „	2 Rats	28th Feb. ...	.....	.....
1887.			1887.	1887.	
13th April	1 Rat.....	Thrown up....	10th April ...	3rd January	75½
24th „	1 Rat.....	1st May.....	.....	29th „	73
10th May	1 Rat.....	16th „ .....	.....	20th Feb.	78
30th „	1 Hen	28th „ .....	.....	7th March.	82

NOTES ON THE BREEDING OF THE KENTISH RINGED PLOVER (*ÆGIALITIS CANTIANUS*) WITHIN INDIAN LIMITS.

BY LIEUT. H. E. BARNES.

MANY years ago Captain (now Colonel) Vincent Legge found the Kentish Dotterel breeding in numbers on the banks of the salt pans in the south-eastern portion of the island of Ceylon.

Mr. Hume having received eggs and a skin from Captain Legge writes as follows in *Nests and Eggs of Indian Birds* :—

“ Two of these eggs sent me by Mr. Legge measure respectively 1·23 and 1·2 by 0·87 and 0·85, and therefore in dimensions correspond precisely with those of the next species,* as, indeed, they do also in colour, shape, and markings.

“ Mr. Legge also favoured me with one of the old birds, which he considered to have belonged to the eggs. It is clearly *Cantianus*, but it is in entirely non-breeding plumage (though killed on the 7th July) without either black or rufous about the head. He also informs me that all the specimens killed by him at that time were similarly in non-breeding plumage.

* 849. *Ægialitis dubia*.

“ The bird sent me is a young bird, a year old or thereabouts, and I cannot help fearing (every one who has taken their nests in Europe knows how difficult it is to catch them on their nests) that Mr. Legge’s specimens may all have been young birds, that remained behind when their parents returned to their breeding haunts, and that the eggs which he attributes to them in reality belonged to individuals of the next species.”

The following season (1873), Captain Legge again found them breeding and shot the old birds from the nest, but still Mr. Hume remained unconvinced.

Up to the present time I am not aware of anything more being placed on record regarding the breeding of the Kentish Plover within Indian limits, but Dr. Scully found them breeding on the 25th April in Eastern Turkistan, and it will perhaps be remembered that Captain Butler shot a specimen at the island of Henjam, in the Persian Gulf, in May, with the testes much developed as if breeding, but he does not say what plumage this particular bird was in. He also says that he found the Kentish Plover breeding on the bare sandy plain at Jashk ; and although he found no eggs, he caught a young bird unable to fly, about ten days old, and a specimen he shot at the same time was in winter plumage.

On the 28th April of the present year, Mr. J. W. N. Cumming, a young but earnest and reliable fellow-worker in Oology, found a clutch of three eggs placed in a slight depression in the sand at the base of a small hillock not far from the sea ; on the 9th May he found three nestlings of the same species, and from his description of the manner in which the parent bird (which he shot) tried to entice him from their vicinity, there can be no reasonable doubt of their authenticity.

This skin was forwarded by Mr. Cumming to the Honorary Secretary of the Bombay Natural History Society, from whom I received it. It is without doubt a young bird of *Ægialitis cantianus*, exactly as Mr. Hume describes ; but to prevent any possibility of error I had the skin identified by Mr. Murray, Manager of the Victoria Natural History Institute, Mazagon, and for many years Curator to the Karachi Municipal Museum, who, after a most careful examination, fully endorsed my identification. Mr. Cumming’s valuable find has therefore confirmed Colonel Legge’s assertion, that the eggs he took in Ceylon belonged to *Æ. cantianus* and not to *Æ. dubia*.

Mr. Hume lays some stress on the fact that the eggs sent to him by Colonel Legge are much smaller than European specimens usually are; but if, as seems certain, only yearling birds breed with or near us, then their eggs, being under the average, need not excite surprise. The eggs of *Ægialitis cantiana*, taken by Dr. Scully in Eastern Turkestan, are about the same size. Below I append a table giving the dimensions of the two eggs in Mr. Hume's possession, of four with Colonel Legge, three of Dr. Scully, and one sent me by Mr. Cumming. The first eggs of many domesticated birds are often abnormally small, as every housewife knows, and I have a crow's egg, taken from the nest, not much larger than a sparrow's egg.

I have very carefully compared one of the eggs taken by Mr. Cumming (which he kindly lent me) with European eggs, and I find that, except in size, it does not differ: the ground colour and the markings are exactly similar, but on the other hand it differs considerably from eggs of *Æ. minutus*, Pall (*Jerdoni*), of which I took a large number at Neenuch. The difference is hard to explain in words; but when the eggs are placed side by side it is very noticeable. The markings of the egg of *minutus* being more speckly and scratchy and not so distinct as in eggs of *cantianus*, I am myself quite convinced of the authenticity of these eggs.

Dimension of Eggs of Ægialitis cantianus.

Number.	Mr. Hume.		Colonel Vincent Legge.		Dr. Scully.		Mr. Cumming.		REMARKS.
	Length. Ins.	Breadth. Ins.	Length. Ins.	Breadth. Ins.	Length. Ins.	Breadth. Ins.	Length. Ins.	Breadth. Ins.	
1	1·23	0·87	1·21	0·85	1·24	0·92	1·25	0·87	Mr. Hume says that European eggs vary from 1·25 to 1·64 inches in length and from 0·95 to 0·96 in breadth.
2	1·2	0·85	1·25	0·89	1·22	0·91	...	—	
3	...	..	1·23	0·89	1·21	0·90	...	..
4	...	...	1·2	0·92	..	...	..	—

ON MIMICRY IN BUTTERFLIES FOR PROTECTION.

BY COL. CHAS. SWINHOE, F.L.S., F.Z.S., F.E.S.

THAT butterflies are to be found all over the world, clothed in colours and patterns closely resembling their surroundings, has been long

known. Groups like the Satyrinæ that are fond of shady places and live on hill sides and rocky dells are nearly always of a dull-brown colour; the Euplocinæ that inhabit dark moist dells and live in the thick undergrowth of forests are all black; the Pierinæ that fly about in the sun in almost any kind of climate are generally white or yellow; and the desert group of this family, the Teracoli, that mostly frequent barren sandy tracts in the hottest parts of the world have their white colours tinted and patched with most brilliant sun-spots of bright yellow and salmon colour; they only fly about in the hottest part of the day, and are very difficult to distinguish. Then there are the leaf butterflies, or Kallimas, and their allies, which, when on the wing, frequent the tops of high trees; their flight is very swift, and most of them are of large size. On the upper surface their wings are often brilliantly coloured, but underneath have the colouration and markings of various kinds of leaves, and when they settle, you see them vanish into a tree and become at once invisible. The common Indian form, *Kallima inachis*, for instance, a N.-W. Himalayan insect, generally settles amongst the dried leaves of a tree, and perching head downwards with closed wings so exactly resemble a dried leaf as to be invisible. Many of the Pierinæ have also mimic eaves on their under surface. The largest of them are the Hebomoias. I have only two species of this genus, *H. glaucippe*, from various parts of India—very plentiful in Bombay, on Malabar Hill—and the Nicobar species, *Rceepstorffii*, and they both represent excellent imitations of leaves on their under surface. The subject, however, of the mimicry of one form of butterfly or another form was first brought clearly before the scientific world by Mr. Bates in an excellent paper which appeared in the Transactions of the Linnæan Society for 1862, Vol. 33, p. 495, and subsequently Mr. Wallace brought many remarkable facts on this subject to light. It was observed by Mr. Bates that imitating species are comparatively rare, whilst the imitated are to be found in great numbers, the two sets living together. The imitated were for the most part brilliantly coloured insects, and he therefore concluded that they must be protected from the attacks of birds, &c., by some secretion or noxious odour, and this has now been abundantly proved, and his paper on this subject in P. E. S. 1866, 3rd December, p. 45, is well worth reading. I do not propose to give just now a paper of scientific deductions. The principle of mimicry has been written about and argued out by many scientific men since Mr. Bates first brought

the matter to light in 1862. I simply propose to show as many of the types of mimicry as I can from the examples out of my own private collection of butterflies. As to how one butterfly comes to mimic another for protection has been explained by many authors, and not always on the same theory; but I take it that Darwin's explanation that many species of Lepidoptera are liable to considerable and abrupt variations of colour is the keynote of the whole mystery. Let us look at *Hypolimnas misippus*. The normal form of this butterfly is black, with large white spots on the wings; the female mimics *Danais chrysippus* in its colouration and markings, this butterfly being of a bronze-reddish colour. Now the male of *Hypolimnas misippus* is a very pugnacious insect and is very active, and has a remarkably quick flight, and is therefore capable of protecting itself; it is very good food for birds, lizards, &c., and whenever caught is a delicious mouthful; the female, however, is much slower in flight, and when heavily laden with eggs is easily captured. *Danais chrysippus*, on the contrary, like all the Danainæ group, is a butterfly that no bird or lizard will touch, and both these species live in the same places. Now, supposing at some former period, in accordance with the well-known fact that *Hypolimnas misippus* in common with many species of lepidoptera being liable to considerable and abrupt variation in colour (I myself have a very curiously coloured female of this group), if a female appeared of a reddish or bronzy tinge (a not uncommon occurrence with black butterflies), would it not be probable that it would have a greater chance of escaping the attacks of birds and lizards than its black sisters? Some of its progeny would also probably have a bronzy tinge, and these also would have the greater chance to escape, and so on, from generation to generation the more bronzy the offspring became, and the more they resembled the colouration of the protecting species, the more they would become protected themselves, until, in the course of ages, the black form of the female *H. misippus* would cease to exist and its place would be taken by the beautiful female mimic of *Danais chrysippus*; and it is curious to observe that the protected and protecting forms are invariably found together. *Danais chrysippus* is an insect common in many parts of the world, all over India, Burma, and Ceylon, in the Phillippine Islands, in Turkey, Madagascar, Arabia, and the west, south, and south-eastern coast of Africa, and in all these places (I am not sure about Turkey) the protected form, *Hypolimnus misippus*, is also to be found. In Aden and in several parts of

Africa there is a form of *Danaïs chrysippus*, called *D. alcippus*, with white hind wings, and in all such places the protected form of *H. misippus* is found with white wings; and in Aden, on the Kutch Coast in Sind, and in parts of the interior of Africa, there is a form of *D. chrysippus* called *D. dorippus*, without the black apical patch to the four wings, and in these places the female of *H. misippus* is also coloured and marked similarly. This form of the female of *H. misippus* is frequently to be seen in Bombay and other parts of India, and it is not at all uncommon, though not nearly so plentiful, as the *D. chrysippus* form. On observing this I have for some years collected all the *D. chrysippus* I could get together in the expectation of getting some *D. dorippus*, and in this I have not been disappointed, and I have now specimens in my collection from Bombay, Poona, Khandalla, and from the Punjab. It is, however, nothing like so common as the female of *H. misippus*, which mimics this form, reversing the rule that the imitating species are comparatively rare whilst the imitated swarm in large numbers; but this only shows that in former ages in these places the form *D. dorippus* was a common form, and that it has gradually been dying out and is now very nearly extinct. On the principle that mimicry is merely for protection, and that the protecting butterflies are those most abundant, we would here in India naturally expect to find the several species of the sub-families Euploëinæ and Danainæ more frequently mimicked than any other kind, because many of the species of both these sub-families are to be found in great abundance in most parts of India, and all are distasteful to birds, lizards, &c., and this is actually the case. It is very difficult to demonstrate facts of this nature from a private collection from want of sufficient specimens, but happily my collection affords some very interesting examples, and though I cannot in all cases show the exact species mimicked, some of the mimicking species being from parts of India, from which I have not many specimens, still I can show forms sufficiently allied to make the matter understood. We will first take the Euploëinæ, of which the common form is *E. core*. It has many allies all over India, and its allies are more or less closely mimicked by several species of *Papilio*—*Papilio panope*, *Papilio clytia*, *Papilio lankeswara*, *Papilio dravidarum*, and the female of *P. castor*, also *Papilio tavoyana*, which exactly mimics *Euploea alcatheae* from the same parts of India, and of which I happen to have two good examples. There is another butterfly the female of which also mimics the Euploëas—a butterfly called *Hypolimnas bolina*,

of the family Nymphalinæ, widely separated from the family Papilioninæ. In case No. 2 are also some very interesting mimics of two other common species of Euploea—*E. midamas* and *E. rhadamanthus*. On the left of the former are two moths called *Amesia aliris*, which mimic the male, and three other moths called *Amesia midama* (all of the family Chalcosidæ) which, mimic both sexes of *E. midamas*; and on the right of these Euploëas are also five excellent mimics, all butterflies of the family Elymniinæ, *E. leucocyma* and *Dyctis patna*, the sexes of which mimic the same sexes of *E. midamas*. In the next column are some specimens of *E. rhadamanthus* of both sexes and to their right are a number of *Euripus halitherses*, a butterfly of the family Nymphalinæ, the males of which mimic a Danaïs I do not possess—I have, however, put in an allied form from Java to show the pattern), and the female mimics two forms of Euploea, *E. rhadamanthus* and a black Euploea I do not possess. Next we will take the red Danainæ (case 3), *D. chrysippus*, *D. dorippus*, and *D. alcippus*. We will there see the female of *Hypolymnas* mimicking all these, as before explained, and *Danaïs genutia* you will find in the next column mimicked by the females of three different species of the family Elymniinæ, *i. e.*, *E. fraterna* from Ceylon, *E. caudata* from South India, and *E. undularis* from Sikkim and Assam. There is a female of the last named species received last week from Rangoon along with the allied form of *D. genutia* from that part of India, with white hind wings called *D. hegisippus*, and it is very curious to observe that the hind wings of this and *E. undularis* as also whitish. In this case I also show you another species of this family called *Dyctis vasudeva*, which mimics a *Delias* of the family Pierinæ, a gaudily-coloured common genus which nothing will eat. In case No. 4 are some white Danias mimicked by various kinds of Papilios, by one species of the family Nymphalinæ, *Hestina nama*, and by one species of the family Satyrinæ, *Orinoma damaris*. *Euploea tytia* and *E. malaneus* beautifully mimicked by *Papilio agestor* and *P. Govindra*; also *P. epycides*, *P. megareus*, *P. macareus*, *P. xenocles*, and *Hestina nama* of the family Nymphalinæ, all of which mimic various forms of white Danaïs, the nearest allies of which to be found in my collection I have placed in the case for comparison. Finally, in case No. 5 there are some insects that mimic the common *Papilio diphilus* and its allies, a butterfly most distasteful to birds, &c. In the left is *P. pammon*, the female of which mimics two species,

P. diphilus and *P. hector*, and in the Nicobars the female of the variety *Nicobarus* mimics the Nicobar variety of *P. diphilus*, called *P. camorta*. Then you will see *P. janaka* is mimicked by a moth called *Epicopeia polidora*, of the family Chalcosidæ, and *P. aidoneus* is mimicked by another moth of the same genus called *Epicopeia polinora*. If we examine into the moths we find numerous cases of mimicry, commencing with the Zygaenidæ, which mimic various kinds of hornets, wasps, and flies, but time does not admit of my going into these. There is another form of so-called mimicry, which is not mimicry at all. In the family Euplocinæ there are many series of species which in their markings much resemble each other, but as they are all distasteful to birds, lizards, &c., there can be, in so far as we know, no reason why they should mimic each other; but, as has been already shown to you, many of them are very closely mimicked by various other kinds of butterflies, some of which belong to families widely separated from each other and by many moths. All the Indian species of Euplocinæ, except one, *E. Andamanensis*, are coloured black, and it is undoubtedly a fact that many of them, though differing so much in the shape of their wings and in their sexual marks as to have caused their separation into different sub-genera, are so nearly like each other in their markings as to be hardly distinguishable except to the experienced lepidopterist. These similarly marked species, in so far as I can understand it, must have had the same common ancestor, and for some reason unknown to us, though their markings have remained similar, the shape of their wings and the sexual brands on their wings, have become altered in the course of time, to adapt them to their conditions of life in the great struggle for existence. It is also very curious to note how evenly these changes seem to have occurred in widely separated places, such, for instance, as in Bombay and Ceylon, where we have the common form, *E. core*, a black insect with largish white sub-marginal and marginal spots; it has the hinder margin of the fore wings nearly straight, and one small sexual brand on the fore wings of the male. We also get in Bombay *E. Kollari*, so like it in its markings as to make it seem at the first glance to be the same insect, but if you examine it carefully you will see that it is quite different in the shape and size of the wings in both sexes, and the hinder margin of the fore wing is deeply curved outwards, and the sexual brand of the fore wing is also quite different. Now in Ceylon we have a form of *E. core*

called *E. asela*, also quite common there, differing from *E. core* in having all the spots small; and we also get *E. sinhala*, differing from *E. Kollari* in exactly the same way that *E. asela* differs from *E. core*. The core form is very common, and the Kollari form is rare, and I believe the latter was the original form; that it is gradually dying out and has been replaced and pushed out of existence by the other, which has now become the common form. I cannot do better than to end this paper with a quotation from Darwin on this subject; he says:—“As in each fully-stocked country natural selection necessarily acts by the selected form having some advantage in the struggle for life over other forms, there will be a constant tendency in the improved descendants of any one species to supplant and exterminate in each stage of descent their predecessors and their original parent.”

MARATHI NAMES OF PLANTS.

WITH A GLOSSARY.

BY BRIGADE-SURGEON W. DYMCK.

MOLESWORTH remarks, in the Preface to his Dictionary, that such words as आंबा, केळ or केळी, जांब, फणस, &c., are applied indifferently to the tree and to the fruit, especially in the Konkan; but that the Desh-people prefer to say आंब्याचें झाड, केळीचें झाड &c., for the tree or plant and आंबा, केळें, जांब, &c., for the fruit. (*Op. cit.* Pref. p. xiii.)

At the same time, when it is desired to distinguish between the tree and the fruit, it is usual to make the tree feminine and the fruit masculine, thus, the tree *Garcinia indica* would be रतांबी and the fruit रतांबा. To this rule, however, there are many exceptions, *e. g.*, another name for the same tree and for its fruit is भिरंड, a feminine noun, whilst the seed is called भिरंडी, also a feminine noun.

Many foreign names, usually more or less mutilated, are to be found in Marathi books; these are mostly derived from the Hindi, Guzarathi, and Canarese languages, and, of course, are most prevalent in the Northern Konkan, the Eastern Dakhan, and Savant Wari Districts.

We also find that many names are very local and often quite unknown beyond the district in which they are current.

Some names are applied very loosely to different plants having similar properties, or resembling one another in appearance; for example, अकू and भेंडा, the first being used to indicate several of the

Araceae and also various trees bearing plum-like fruits; the second is the name of *Æschynomene aspera*, *Hibiscus esculentus* and several plants having similar flowers, such as *Thespesia populnea*, &c.

The Marathi names of plants, like the Hindi and Guzarathi names, are many of them of Sanskrit origin, and as well as the non-Sanskrit names, are mostly descriptive of some property or peculiarity of appearance possessed by the plant; e.g., वाघचबका (Tiger's-mouth) is *Gloriosa superba*, खुळखुळडिंगळा (Rattle-pod Dingala) is *Crotalaria Leschenaultii*, खाजेटी and similar names are applied to nettles and such plants as irritate the skin, देवडांगर or (Fairies' pumpkin) is *Luffa echinata*, &c.

With regard to Sanskrit names of plants their identification is often a hopeless task, owing to the number of different plants to which similar names have been given. Thus *Amara* means *Euphorbia Tirucalli* and *Tiaridium indicum*, *Amarú Panicum dactylon* and *Tinospora cordifolia*, *Amara-pushpa Saccharum spontaneum*, *Pandanus odoratissimus* and *Mangifera indica*. *Amritá*, essentially the same name, means *Phyllanthus Emblica*, *Terminalia Chebula*, *Tinospora cordifolia*, *Piper longum*, *Ocimum sanctum*, *Citrullus Colocynthis*, &c.

In this neighbourhood *Amarvel*, *Ambarvel* or *Amritvel* would be understood to mean *Tinospora cordifolia*, a plant which really deserves the name of *Amarú*.

Marathi names are not free from ambiguity; thus we have several *Rats'-ears*, Undirachekán or Undirkáni, in no way related to one another generically, and such vague terms as "the white tree," "the black creeper," "the sour bush" are not infrequent.

Many plants have the same names as cultivated ones, to which they bear a certain resemblance, with the addition of Jangli, Rán, Van or Véra, words meaning 'wild,' e.g., जंगली भेंडा, रानवेवडा, वेडी हळद वनजाई Wild Bhenda, Wild Lablab Bean, Wild Turmeric, Wild Jasmine, names applied to *Hibiscus tetraphyllus*, *Cylista scariosa*, *Curcuma aromatica*, *Salisb.* and *Clerodendron inerme*. Other distinguishing adjectives in common use are देव, equivalent to our Fairy, कांटे Thorny, कडू Bitter, काळा Black, खारा Salt, गोड Sweet, चौधारा Four-cornered, डोंगरी Mountain, तांबडा Red, थोरला Great, धाकटा Small, नाग Snake-like, पांढरा White, पहाडी Hill, पिवळा Yellow, भुई Ground, i.e., procumbent or dwarf; महा Great, मोठा Large, राज Royal, रतन and रक्त Red, राम belonging to Ram, राय Royal, लहान Small, लाल Red, विलायती Foreign, शिव

belonging to Shiva, सूर्य Sun, सोन Golden, हिरण belonging to Deer, &c.

Corruptions are not uncommon; the country-people say Erá or Rérá for Vêrâ (वेडा), wild. Yél for Vél, a creeper, Héla or Ela for Wabhéla, the name of *Terminalia belerica*, &c.

Errors of pronounciation have been the cause of many mistakes in Marathi names when written in English characters.

In the list of names, which I now present to the Society, I have taken much trouble to ascertain the orthography of the words; 1st, by extracting all the names of plants from Molesworth's Dictionary and from several Marathi books on wild medicinal plants; 2nd, by comparing the list thus made with the names found in English botanical works, the spelling of which I have thus in most cases been able to correct when necessary. The list thus revised contains about 1,200 Latin names of plants found in this Presidency or sold in the Bazars with usually two or three Marathi or Guzarathi equivalents for each botanical name.

There still remain on hand a number of vernacular names for future identification and incorporation in the Glossary.

GLOSSARY.

Abelmoschus, <i>see</i> Hibiscus.	
Abroma augusta, <i>Linn.</i>	ओलकतंबोल Olaktambol, or ओलतकंबोल Olatkambol.
Abrus precatorius, <i>Linn.</i>	गुंज, Gunj, चणोटी Chanoti.
Abutilon graveolens, <i>W. & A.</i>	मुद्दाम Mudám.
„ indicum, <i>G. Don.</i> ...	पेटारी Petári, मन्नी Madmi, करंडी Karandi.
„ „ var tomentosum.	चक्रभेडा Chakrabhendá. The seed is sold in the shops as बलबीज Balbij. The capsules of these plants are called मुद्रा Mudrá, from their resemblance to a seal.
„ muticum, <i>G. Don.</i>	कसिली Kasili.
Acacia arabica, <i>Willd.</i>	बाभूळ Bábhúl.
„ „ var	वेडीबाभूळ Veribábhúl.
„ „ var	रामकांटा Rámakántá.
„ „ seeds	धामुकी Dhámuki
„ Catechu, <i>Willd.</i>	खदेरी Khadéri, खैर Khair.
„ „ catechuic acid	Found in cavities in the wood. खैरसार Khairsár.

<i>Acacia catechu</i> , var	शेप्याखैर Shepiya-khair.
„ <i>concinna</i> , <i>DC.</i>	शिका Shiká, the pods शिकाकाई Shikákai.
„ <i>eburnea</i> , <i>Willd.</i>	मरमत Marmat.
„ <i>Farnesiana</i> , <i>Willd.</i> ...	गूयबाभूळ Guyabábhúl, कंकर Kankar.
„ <i>ferruginea</i> , <i>DC.</i>	पांढराखैर Pándhará Khair.
„ <i>Intsia</i> , <i>Willd.</i>	चिलार Chilár, or चिल्हार Chilhár.
„ <i>Latronum</i> , <i>Willd.</i>	देवबाभूळ Deobábhúl, भेस Bhes.
„ <i>leucophlæa</i> , <i>Willd.</i> ...	हेवूर Hevúr, पांढरी बाभूळ Pándhari bábhúl.
„ <i>odoratissima</i> , <i>Benth.</i> ...	फळफळा Phalphalá.
„ <i>pennata</i> <i>Willd.</i>	शेंबी Shembi, शेंबरटी Shembertī.
„ <i>procera</i>	See <i>Albizzia procera</i> .
„ <i>stipulata</i>	See <i>Albizzia stipulata</i> .
„ <i>Suma</i> , <i>Kurz.</i>	कमटिआ Kamtiyá.
„ <i>Sundra</i> , <i>DC.</i>	लालखैर Lálkhair.
„ <i>sp.</i>	कीमजी Kimaji. (Grah. Cat. 468.)
„ (extract)	अकाकिआ Akákiá (<i>impd.</i>)
<i>Acalypha indica</i> , <i>Linn.</i>	कुपी Kupi, खोकली Khokali.
<i>Acampe papillosa</i> , <i>Lindl.</i>	रास्ना Rásná, कानभेर Kánbhér.
<i>Acanthodium spicatum</i>	See <i>Blepharis edulis</i> .
<i>Acanthus ilicifolius</i> , <i>Blume</i> ...	मारांडी Márándi, मोराण्णा Moránná.
<i>Achillea millefolium</i> , <i>Linn.</i> ...	राजमरी Rojamari.
„ <i>Santolina</i> , <i>Linn.</i> ...	बिरंजासिफ Biranjásif.
<i>Achras Sapota</i> , <i>Linn.</i>	चिकू Chikú, कवठ Kavath.
<i>Achyranthes alternifolia</i> , <i>Linn.</i>	गेतना Getaná.
„ <i>aspera</i> , <i>Linn.</i> ...	आघाडा Ághádá, खरमंजरी Kharmanjari.
<i>Aconitum ferox</i> , <i>Wall</i> (root)...	बचनाब Bachnáb, or बचनाग Bachnág (<i>impd.</i>)
„ <i>heterophyllum</i> , <i>Wall.</i>	अतीस Atis, अतिविष Ativish (<i>impd.</i>)
(root).	
„ <i>sp.</i> (tubers)	वखमा Vakhmá, बिखमा Bikhmá.
<i>Acorus Calamns</i> , <i>Linn.</i>	वेखंड Vekhand, वचवेखंड Vachvekhand.
	गोडा वच Gorá-vach.
<i>Actinopteris radiata</i> , <i>Linn.</i> ...	मापुरसिक Mápursik.
<i>Adansonia digitata</i> , <i>Linn.</i>	गोरखचिंच Gorakhechinch, गोरखअमली Gorakhamli, वावबाब Váváb.
<i>Adenostemma viscosum</i>	रानजिरे Ránjiren.
<i>Adenantha pavonina</i> , <i>Linn.</i>	वाल Vál, थोरली गुंज Thorli gunj.
<i>Adenoon indicum</i>	मोठी सोंकी Moṭhi-sonki.
<i>Adhatoda Vasica</i> , <i>Nees</i>	अडुळसा Adúlsá, बासा Bása, अटरुष Atarussha.
<i>Adiantum lunulatum</i> , <i>Burm.</i>	मुबारक Mubárak, हंसराज Hansráj, घोडखुरी
et <i>venustum</i> , <i>Don.</i>	Ghorkhúri.
<i>Adina cordifolia</i> , <i>H. f.</i>	एदू Edú, or हेदू Hedú.
<i>Ægiceras corniculata</i> , <i>Blanco.</i>	कांजला Kánjalá.

<i>Ægle Marmelos</i> , <i>Corr.</i>	बेल Bel, बिल Bil or बिल्वा Bilvá.
<i>Ærides maculosum</i> , <i>Lindl.</i> ...	इचवाच Ichvach.
<i>Ærva lanata</i> , <i>Juss.</i>	कापूर मधुरा Kápúr-madhurá.
<i>Æschenomene aspera</i> , <i>Linn.</i> ...	भेंड Bhend. The dry stem from Bengal, used by women to keep earring-holes open. The sola hat is made of it.
<i>Ætheilema reniforme</i>	See <i>Justicia infundibuliformis</i> .
<i>Agaricus campestris</i> , <i>Linn.</i> ...	अलॉबें Alombén.
„ <i>officinalis</i>	See <i>Polyporus officinalis</i> .
<i>Agati grandiflora</i>	See <i>Sesbania grandiflora</i> .
<i>Agave americana</i> , <i>Linn</i>	पालकांडे Pálkándé, जंगली अनास Jangli anás.
<i>Ageratum conyzoides</i> , <i>Linn.</i> ...	ओसाडी Osári.
<i>Aglaiia odorata</i> , <i>Lour.</i>	प्रियंगु Priyangu.
<i>Ailanthus excelsa</i> , <i>Roxb.</i>	महारूख Mahárúkh.
„ <i>malabarica</i> , <i>DC.</i>	बाग्याधूप Bágyádhúp, ऊद् Ûd.
<i>Alangium Lamarckii</i> , <i>Thwaites</i> .	काळा आकोल Kálá ákol, or अंकोल Ankol.
<i>Albizzia amara</i> , <i>Boivin</i>	लुलाई Lúlái, लायली Láyali.
„ <i>Lebbek</i> , <i>Benth</i>	शिरस Shiras, चिचोला Chicholá.
„ <i>odoratissima</i> , <i>Benth</i> ..	शिरस Shiras, चिचिंडा Chinchindá or चिचवा Chichvá.
„ <i>procera</i> , <i>Benth.</i>	किनई Kinai, गुरार Gurár.
„ <i>stipulata</i> , <i>Boivin</i>	ऊदुल Ûdul, कसीर Kasir.
<i>Algæ</i> sp. var. (pond weeds) ..	शेवाळ Shevál.
<i>Aleurites moluccana</i> , <i>Willd.</i> ...	अखरोट Akhrot, जाफळ Jáphal.
<i>Alhagí maurorum</i> , <i>Desv.</i>	जवासा Javásá, or यवासा Yávásá.
„ „ <i>manna</i> (<i>impd.</i>)	तुरंजबीन् Turanjabin.
<i>Allamanda cathartica</i> , <i>Linn.</i> ...	जहरी सोनटक्का Jahari sontakká.
<i>Allium Ceba</i> , <i>Linn.</i>	कांदा Kándá, ऊळ Ûl, पलांडू Palándú, पियाज Piyáj, डुंगळी Dungli.
„ <i>porrum</i> , <i>Linn.</i>	खोरद Khorat.
„ <i>sativum</i> , <i>Linn.</i>	लहसन Lahsan, लसूण Lasún, or लशुन Lashun.
„ sp. (Muscat garlic) ...	सीरेबरी Sirebari (<i>impd.</i>)
„ „	एककांदा लहसन Ekkánda lahsan, in bazar, it comes from Gogo.
<i>Allophyllus</i> Cobbe, <i>Bl.</i>	तीपिन Tipin, मेंड्री Mendri.
<i>Alocasia indica</i> , <i>Schott</i>	अळू Alún, तेरें अळू Téré-alún.
<i>Aloe abyssinica</i> , <i>Lam.</i>	कुंवार Kunvár, कौरकंड Korkand, कौरफाड Koraphad.
„ extract of	एळिया Eliyá.
„ perryi, <i>Baker</i> , extract, (<i>impd.</i>)	सोकोत्री एळिया, Sokotri eliyá.

Aloexylon Agallochum	See Aquilaria Agallocha.
Alpinia Allughas, <i>Rosc.</i>	तागक Tárak.
„ Galanga, <i>Swz.</i>	कोष्ट कुलिंजन Kosht kulinjan. (<i>The great Galangal, impd.</i>)
„ nutans, <i>Rosc.</i>	पुणाचंपा Punáchampá, नागफणीचंपा Nág-phanichampá.
„ officinarum, <i>Hance</i> ..	पानकीजर Pánkijar, कुलिंजन Kulinjan. (<i>China Galangal, impd.</i>)
Alstonia scholaris, <i>R. Br.</i> ...	सातवीण Sátavin, सप्तपर्णि Saptaparni.
Alternanthera sessilis, <i>R. Br.</i> ...	कांचरी Kánchari.
Althoea officinalis, <i>Linn.</i> (root)	खित्मी Khitmi (<i>impd.</i>)
„ „ (flowers)	गुलखैरो Gulkhairo (<i>impd.</i>)
Alysicarpus vaginalis, <i>D. C.</i> ...	चाई Chái, लडुंडीचाई Ladundi cháí.
Amarantus Blitum, <i>Linn.</i>	पोकळा Pokalá.
„ gangeticus, <i>Linn.</i> ..	माठ Máth, red kind तांबडा माठ Támbará máth.
„ polygamus, <i>Linn.</i> ...	चौळइ Choulai.
„ spinosus, <i>Linn.</i> ..	कांटेभाजी Kántebháji, कांटेमाठ Kántemáth.
„ tenuifolius, <i>Willd.</i>	घोळ Ghol.
Ammannia baccifera, <i>Linn.</i> ...	अगिनबुटी Aginbuti, भारजांभूळ Bharjámabhúl, आगिया Ágiyá.
Amomum Cardamomum,	See Elettaria Cardamomum.
„ Korarima, <i>Pareira.</i> ..	मोठी एलची Mothi elachi, मोठे वेलदोडे Mothé veldoré (<i>impd.</i>)
„ subulatum, <i>Roxb.</i>	„ „ (<i>impd.</i>)
„ xanthoides, <i>Wall</i> ...	एलची दाणे Elachi dane (<i>impd.</i>)
Amoora Rohituka, <i>W. & A.</i> ...	रोहितक Rohitak, हरमखाना Haramkháná.
Amorphophalluscampanulatus, <i>Blume.</i>	सुरण Suran.
„ „ wild kind,	जंगली सुरण Jangli suran, and when dried, मदनमस्त Madanmast.
„ sylvaticus ...	See Synantherias sylvatica.
Amygdalus communis	See Prunus amygdalus.
Amyris heptaphylla	See Clausena heptaphylla.
Anacardium occidentale, <i>Linn.</i>	काजू or काजवीण Kájú or Kájvin. (Goa almond.)
„ „ (tar) ...	डीक Dik.
Anacyclus Pyrethrum, <i>D. C.</i> (root)	अकलकारा Akkalkará (<i>impd.</i>)
Anamirta Cocculus, <i>W. & A.</i> ...	वाटोली Vátoli, कडवी Karvi.
„ „ fruit	काकफळ Kákphal, कडवावाल Karvával.
Ananassa sativa, <i>Linn.</i>	अननस Ananas, vulg. अन्नास annás.

Anastatica Hierochuntina, <i>Linn.</i>	कफेमरीयम Kafemariyam (<i>impd.</i>)
Anchusa tinctoria, <i>Desv.</i>	रतनजोत Ratanjot, रंगेबादशाह Rangebádsháh (<i>impd.</i>) from China.
Ancistrocladus Heyneanus, <i>Wall.</i>	खरदळी Khardali, करदोंडी Kardondi or करदोडी Kardodi.
Andrographis echioides, <i>Nees</i> ...	रानाचिनणी Ránchimni.
„ paniculata, <i>Nees</i> ...	ओले किराईत Olen-kiráit.
Andropogon aciculatus, <i>Retz</i> ...	शंखपुष्पी Shankapushpi.
„ citratus, <i>D. C.</i> ...	ओला चाहा Olá, cháhá, पाल्याचाह Paliya-cháhá, पातीचा चाहा Páticha cháhá.
„ glaber, <i>Roxb.</i> ...	तांबट, Támbat.
„ laniger, <i>Desf.</i> (Herba Schœnanthi)	जरांकुश Jarámkush, अझखीर Azkhir, खावी Khávi.
„ muricatus, <i>Retz</i> ...	वाळ Vál, वारेळू Várelú, खसखस Khaskhas, उशीर Úshir.
„ Nardus, <i>Linn.</i> ...	ऊसधन Usadhan.
„ scandens, <i>Roxb.</i> ...	मारवेल, Márvel.
„ Schœnanthus, <i>Linn</i>	राशेगवत Roshegavat, रोहिष Rohish.
Anethum graveolens	See Pencedanum graveolens.
Anguillaria indica	माडकलाई Márkalái, (Melanthium indicum, <i>Wall., Pl., As., Rar.</i> , 3,259.)
Anictoclea Grahamiana	See Tetrameles nudiflora.
Anisochilus carnosus, <i>Wall.</i> ...	कापुर्ली or कपूरवल्ली, Kápúrlí or Karpúrvalli, चोरोवा Chorová, पाणजिरे Panjiren.
Anisomeles Heyneana, <i>Benth.</i>	चौधारा Chaudhára.
malabarica, <i>R. Br.</i>	गोजिभा Gojibhá.
„ ovata, <i>R. Br.</i>	गोपाळी Gopáli.
Anisonema multiflora	See Phyllanthus reticulatus.
Anodendron paniculatum, <i>A.D.C.</i>	लामताणी Lámtáni कुलिबेल Kulivel.
Anogeissus latifolia, <i>Wall.</i>	दाब्रिआ Dábriá दाउरा Dánrá.
„ acuminata, <i>Wall.</i> ...	फास Phás.
Anona muricata, <i>D.C.</i>	मामाफळ Mámáphal.
„ reticulata, <i>Linn.</i>	रामफळ Rámphal.
„ squamosa, <i>Linn.</i>	सिताफळ Sitáphal.
Anthemis nobilis, <i>Linn.</i>	बाबूना Bábúná.
Anthericum tuberosum, <i>Roxb.</i>	चिप्ली चाई Chipli chai, फुरसी Phúrsi, कुळी Kúli.
Anthocephalus Cadamba, <i>Miq.</i>	कदंब Kadamb, न्ह्य Nhyu.
Anthrocneum indicum, <i>Moq.</i>	मचोळ Machol.
Antiaris toxicaria, <i>Leesch.</i>	चांदल Chándal, चांदकुडा Chándkura.

<i>Antidesma Bunias</i> , <i>Spr.</i>	अमटी Amati.
„ <i>Ghæsembilla</i> , <i>Gürt.</i>	जोंध्री Jondhri.
<i>Antirrhinum glaucum</i>	<i>See</i> Schweinfurthia sphærocarpa.
<i>Apium graveolens</i> , <i>Linn.</i>	करफस Karafs, बोरीअजमोद Bori-ajmod.
„ <i>involucratum</i>	<i>See</i> Carum Roxburghii.
<i>Aplotaxis auriculata</i>	<i>See</i> Saussurea Lappa.
<i>Aporosa Lindleyana</i>	साला Sálá.
<i>Aquilaria Agallocha</i> , <i>Roxb.</i> ...	हिंदीअगर Hindi agar, कृष्णागर Krishna-agar.
<i>Arachis hypogæa</i> , <i>Linn.</i>	भुईमुग Bhuimúg, भुईशेंग Bhuisheng.
<i>Aralia Guilfoylia</i>	तापमारी Tápmári.
<i>Ardisia humilis</i> , <i>Vahl.</i>	डिकना Dikná.
<i>Areca Catechu</i> , <i>Linn.</i>	सुपारी Supári, पुंग Púng.
<i>Argemone mexicana</i> , <i>Linn.</i> ...	दारूरी Dárúri, फिरंगी धोत्रा Phirangi-dhotrá, कांटेधोत्रा Kántedhotrá.
<i>Argyreia argentea</i> , <i>Chois.</i>	म्हैसवेल Mhaisvél.
„ <i>elliptica</i>	<i>See</i> Lettsomia elliptica.
„ <i>sericea</i> , <i>Dalz.</i>	गावेल Gávél.
„ <i>speciosa</i> , <i>Sweet.</i>	समुद्रशोक Samudra-shok.
<i>Arisæma Murrayi</i> , <i>Dalz.</i>	सर्पाचा कांदा Sarpáchá kándá.
<i>Aristolochia bracteata</i> , <i>Retz</i> ...	गंधाटी Gandhāti किडामार Kirámár.
„ <i>indica</i> , <i>Linn.</i>	सापसन or सापसंद, Sápsan or Sápsand.
„ <i>longa</i> , <i>Linn.</i> (root)	झरावेंदेकलान Zarávaudékalán (<i>impd.</i>)
„ <i>rotunda</i> , <i>Linn.</i> (root)	झरावेंदेगरद Zaráwandégird (<i>impd.</i>)
„ <i>serpentaria</i> , <i>Linn.</i> (root).	काळावाळा Káláválá (<i>impd.</i>)
<i>Arnebia</i> sp.....	रतनजोत Ratanjot.
<i>Artabotrys odoratissima</i>	<i>See</i> Uvaria odoratissima.
<i>Artemisia Absinthium</i> , <i>Linn.</i> ...	अफसंतीन रूमी Afsantiné Rúmi (<i>impd.</i>)
„ <i>maritima</i> , <i>Linn.</i> (flowers).	किरमाणी ओंवा Kirmáni onvá.
„ <i>Sieversiana</i> , <i>Willd.</i> ...	दवणा Dauná.
„ <i>sternutatoria</i>	<i>See</i> Centipeda orbicularis.
„ <i>vulgaris</i> , <i>Linn.</i> var. <i>indica</i> .	सुरबंद Surband, vulg. सुर्पण or सुर्पिण Surpan or Surpin, derived from सूळ and बंद, as it is used to cure bollyache, worms, &c.
<i>Arthrocnemum indicum</i> , <i>Mog.</i> ...	मचोल Machol, घुरी Ghuri.
<i>Artocarpus hirsuta</i> , <i>Lam.</i>	अंजेली Anjeli, पाटफणस Pátphanas, रानफणस Ránphanas, फणसुल Phanasul.
„ <i>incisa</i> , <i>Linn.</i>	विलायती फणस Viláyati Phanas.
„ <i>integrifolia</i> , <i>Linn.</i> ...	फणस Phanas.
„ <i>Lakoocha</i> , <i>Roxb.</i> ...	लोवी Lovi, ओंड Aond, बडर Badhar, वातंबा Vátambá.

Arum nymphaefolium	See Colocasia antiquorum.
„ sessiliflorum	See Sauromatum pedatum.
Arundo Karka, Roxb.	देवनळ or देवनाळ Deonal or Deonál.
Asarum europeum, Linn. (root).	तगर Tagar (<i>impd.</i>), (seldom genuine).
Asclepias curassavica, Linn. ...	कुडकी Kurki, काकतुंडी Káktundi.
Asparagus adscendens, Roxb. ...	सफेदमुसळी Safedmusli, धोळीमुसळी Dholi musli.
„ officinalis, Linn. ...	हलीयून् Haliyun.
„ racemosus, Willd. ...	} शतमुळी Shatmuli, झतर Zatar, आसवेल
„ sarmentosus, Willd. ...	
Asphodelus fistulosus, Linn. ..	बोखत Bokhat, बिघरबीज Bingharbij.
Asteracantha longifolia	See Hygrophylla spinosa.
Astragalus sp. (gum sarcocolla).	गुजर Gujar (<i>impd.</i>)
Atalantia monophylla, Corr. ...	रानलिंबू Raulimbú, माकडनिंबोणी Mákaruimboni, मातंगनार Mátangnár.
Atriplex hortensis, Linn.	जुरी Juri.
Atylosia Lawii	रानतूर Rántúr (A. lineata, W. & A.)
Avena sativa, Linn.	विलायती जाव Viláyati Jáu.
Averrhoa Bilimbi, Linn.	बिलिंबी Bilimbi.
„ Carambola, Linn. ...	खमरक Khamrak, करंबल Karambal, करमळ Karmal.
Avicennia tomentosa	तिवर Tivar (A. officinalis, Linn.)
Azadirachta indica	See Melia Azadirachta.
Balanites Roxburghii, Planch.	हिंगन Hingan, हिंगणबेट Hinganbét.
Balanophora sp.	गजपिंपळी Gajpimpali.
Baliospermum montanum, Müll-Arg. (seed).	जमालगोटा Jamálgotá (<i>false</i>).
„ montanum (root) ...	दांतिमूळ Dántimúl.
Balsamodendron Gileadense (fruit).	हबेलबलेसान Habelbalesán (B. Opobalsamum (<i>Kunth</i>), (<i>impd.</i>))
„ „ (balsam)	बलेसान Balesán (<i>impd.</i>)
„ „ (wood)	उदेबलेसान Udebalesán (<i>impd.</i>)
„ Mukul, Hook (gum resin)	मुकुल Mukul, गुग्गळ Guggal (<i>impd.</i>)
„ Myrra, Nees. (gum resin).	हिराबोळ Hirábol (<i>impd.</i>)
„ Playfairii Hook. f. (gum resin.)	मीनाहरमा Mináharmá (<i>impd.</i>)
„ Roxburghii, Arn. (gum resin).	हैशाबोल गुग्गुळ Mhaisábol, Guggul.
Bambusa aruudinacea, Willd. ..	मांदगाई Mándgái.

<i>Bambusa Arundo, Klein.</i>	चिवारी Chivári.
„ (silica of)	वंशलोचन Vanshlochan, तबाशीर Tabáshir.
„ sp.	मेस Més.
„ stricta, <i>Roxb.</i>	उधावांस Udháváns.
„ vulgaris, <i>Wendl.</i> ...	कळक Kalak, वांसा Vánsá.
<i>Barleria coerulea</i>	वाहिटी Wahiti, काळाकोरांदा Kála Korántá (<i>B. strigosa, Willd.</i>)
„ montána, <i>Nees.</i>	} कोळिस्ता Kolistá, ईखरी Ikhari.
„ courtallica, <i>Nees.</i>	
„ Prionitis, <i>Linn.</i>	कळसुंदा or कासुंदा, Kalsunda or kásundá, पि- वळाकोरांदा Pivalá korántá, कोलिस्ता or कोळिता, Kolistá or Kolitá.
<i>Barringtonia acutangula, Gärtn.</i>	तीवर Tivar, ईंगळी Ingli.
„ „ (fruit).	समुद्रफळ Samudraphal, सातफळ Sáthphal, धात्रीफळ Dhátriphal.
<i>Basella alba, Linn.</i>	मयाळ Mayál, वेळगोंड, Velgond, or वेलबोंडी Velbondi.
<i>Bassia butyracea, Roxb.</i>	फलवा Phalvá.
„ elliptica	See <i>Dichopsis elliptica.</i>
„ latifolia, <i>Roxb.</i>	मोवा Mová, महुआ Mahuá.
„ longifolia, <i>Willd.</i>	मोवा Mová, महुआ Mahuá.
<i>Batatas paniculata</i>	See <i>Ipomœa digitata.</i>
„ edulis	See <i>Ipomœa Batatas.</i>
<i>Bauhinia purpurea, Linn.</i>	देवकांचन Devakáncan, अतमटी Atmati.
„ malabarica, <i>Roxb.</i> ...	कोरल Koral, अमली Amli.
„ racemosa, <i>Lam.</i>	आपटा Áptá, अभिता Abhitá, वनराजा Van- rájá.
„ tomentosa, <i>Linn.</i>	पिवळाकांचन Pivalákáncan, अश्मंतक Ash- mantak.
„ Vahlí, <i>W. & A.</i>	चंबूरी or चंबूली Chambúri or Chambúli.
„ variegata, <i>Linn.</i>	कांचन Káncan.
<i>Begonia crenata, Dryand.</i>	मूतिया Mútiyá.
<i>Benincasa cerifera, Savi.</i>	कोहोळा or कोह्लाळा, Koholá or Kovhálá कूष्मांड Kúshmánd.
<i>Berberis Lycium, Royle.</i>	अंबरबारीस Ambarbáris.
(fruit).	
„ „ (wood)	दारहळद Dárrhalad.
„ „ (extract) ...	रसोत Rasot, रसवंती Raswanti.
<i>Bergera Koenigii</i>	See <i>Murraya Koenigii.</i>
<i>Bergia verticillata, Willd.</i>	हिंताल Hintál.
<i>Berthelotia lanceolata</i>	See <i>Pluchea lanceolata.</i>
<i>Beta vulgaris, Moq.</i>	चुकंदर Chúkandar, पालक Pálak.

<i>Betula Bhojpattra</i> , <i>Wall.</i> (bark)	भोजपत्र Bhojpatr, भूर्जपत्र Bhúrjpatr.
<i>Bignonia chelonoides</i> , <i>Linn.</i> ...	कुणक Kunak, पाडळ Pádal.
<i>Bignonia undulata</i> , <i>Roxb.</i>	कुणक Kunak.
„ <i>spathacea</i>	<i>See Dolichandrone falcata.</i>
„ <i>stans</i> , <i>Willd.</i>	विलायती कुणक Viláyati kunak.
„ <i>suaveolens</i>	<i>See Stereospermum suaveolens.</i>
<i>Biophytum sensitivum</i> , <i>D. C.</i> ...	लोजी Lájri.
<i>Bischoffia javanica</i> , <i>Bl.</i>	बोक Bok.
<i>Bixa Orellana</i> , <i>Linn.</i>	शेंद्री Shendri, केसरी Kesri, केसरबोंडी Kesar bondi.
<i>Blepharis asperrima</i> , <i>Nees</i>	अकडा Akra, पाहाडी अतगन Páhári-Atgan.
„ <i>edulis</i> , <i>Pers.</i>	उतंगण Utangan.
„ <i>molluginifolia</i> , <i>Juss.</i> ...	कांटेमाका Kántemáká.
<i>Blighia sapida</i> , <i>Don.</i>	आकी Áki.
<i>Blumea aurita</i>	<i>See Lagera aurita.</i>
„ <i>holosericea</i> and other strong smelling <i>Blumeas.</i>	भांबुरडा Bhámbúrdá, or भांबरूड Bhámbrúr.
„ <i>sp. nov. near to B. eriantha.</i>	निमुरडी Nimurdi.
<i>Bocagea Dalzelli</i> , <i>H. f. & T.</i>	साजेरी Sajeri, हाडकिंजळ Hárkinjal.
<i>Boerhaavia elegans</i> , <i>Chois.</i> ...	नाकबेल Nákbél (seeds eaten).
„ <i>repens</i> , <i>Linn.</i>	पुनर्नवा Punarnava, खांपरा Khápará. घेतुळी Ghetuli, काळीवसू Kálivasú.
„ <i>verticillata</i> , <i>Poir</i> ...	सतूरा Satúra.
<i>Boletus crocatus</i> , <i>Batsch.</i> var.	फणसआंबा or फणसअलंबे Phanásámbá or Phanasalombé (Isca de Jaca of the Portuguese).
<i>Bombax malabaricum</i> , <i>D. C.</i> ...	सावर Sávar, मोच Mocha.
„ „ (gum)...	मोचरस Mocharas.
<i>Borassus dichotomus</i> , <i>White</i> ...	उखामंडळ Ukhámandal.
„ <i>flabelliformis</i> , <i>Linn.</i> ...	ताड Tár, ताडमाड Tármár.
<i>Borrera Ashneh</i>	<i>See Parmelia kamtschadalis.</i>
<i>Boswellia floribunda</i> , <i>Endl.</i> (frankincense.)	विशेष Visesh, (<i>impd.</i>) vulg. ईसस Esas.
„ „ (bark).	धूप Dhúp, कष्फ Kashfa (<i>impd.</i>)
„ <i>serrata</i> , <i>Roxb.</i> ...	सलाई Salai, गुग्गुळ Guggul, सालफळी Sál-phali.
<i>Bougainvillia spectabilis</i>	बानबेरीस Bánberis.
<i>Bovista</i> , <i>sp.</i>	पाताळतुंबडी Pátáltumbri.
<i>Brachyramphus sonchifolius</i> ...	<i>See Lactuca Heyneana.</i>
<i>Brassica campestris</i> , <i>Linn.</i>	शिरिस Shiris.

<i>Brassica juncea</i> , <i>H. f. & T.</i> ...	मोहरी Mohari, राई Rái.
„ <i>nigra</i> , <i>Koch.</i>	राई Rái.
„ <i>oleracea</i> , <i>Linn.</i>	कोबी Kobi, कोई Koi (Port.)
„ <i>Rapa</i> , <i>Linn.</i>	शलघम् Shalgham.
<i>Brayera anthelmintica</i>	See <i>Hagenia abyssinica</i> .
<i>Briedelia sinica</i>	See <i>Phyllanthus lanceolarius</i> .
„ <i>montana</i> , <i>Willd.</i>	आसाणा Âsáná फत्तरफोड Phattarphor, पालेहसन Páléhasan, हसाणी Hasáni.
<i>Bryonia laciniosa</i> , <i>Linn.</i>	कावदोडी Kavdori.
„ <i>umbellata</i>	See <i>Zehneria umbellata</i> .
<i>Bryophyllum calycinum</i> , <i>Salisb.</i>	घायाळ Gháyal, घायपात Ghaipát, घायमारी Ghaimári. अडणमडण Aranmaran, पर्णबीज Parnabij or leaf-seed.
<i>Buchanania latifolia</i> , <i>Roxb.</i>	पियाळ Piyál, चार Chár, चारोळी Charoli, चाराबोर Chárabor.
<i>Butea frondosa</i> , <i>Roxb.</i>	पळस Palas, खाकरा Khákará.
„ „ (gum).....	पळसगोंद Palasgond, खाकरागोंद Khákará gond.
„ „ (seed).....	पळसपापडा Palaspáparí.
„ <i>parviflora</i>	See <i>Spatholobus Roxburghii</i> .
„ <i>superba</i> , <i>Roxb.</i>	पळसवेळ Palasvél, तिक्स Tivas, तिवत Tivat बेलतिक्स Béltivas.
<i>Cactus indicus</i> , <i>Roxb.</i>	अलिता Alitá.
<i>Cadaba indica</i> , <i>Lam.</i>	कधब Kadhab (Arabic), बाळपुवण Bálpuvan.
<i>Cæsalpinia Bonduc</i> , <i>Roxb.</i>	सागरगोटा Ságargotá, गजगा Gajagá.
„ <i>coriaria</i> , <i>Willd.</i>	लिबिदिबी Libidibi.
„ <i>digyna</i> , <i>Rottl.</i>	वाकेरी Vákéri.
„ <i>pulcherrima</i> , <i>Swtz.</i> ,	शंकासूर Shankásúr, मोरशिखा Morshikhá.
„ <i>Sappan</i> , <i>Linn.</i>	पतंग Patang.
„ <i>sepiaria</i> , <i>Roxb.</i>	चिल्लर Chillar.
<i>Cajanus indicus</i> , <i>Spr.</i>	तूर Túr.
<i>Calacanthus Dalzelliana</i> , <i>T. Anders.</i>	मोतयें Motayén.
<i>Caladium</i> sp. var.....	अळू Alún (cultivated for ornament).
<i>Calamus Draco</i> , <i>Willd.</i> (gum resin).	हिरादखन Hirádakhan, हिरादुखी Hirádnkhi.
„ <i>Rotang</i>	बेत Vet, बेत Bet.
<i>Callicarpa lanata</i> , <i>Linn.</i>	ऐसर Aisar.
<i>Callitris quadrivalvis</i> , <i>Vent.</i> The gum.	चंद्रस Chandras, (impd.)
<i>Calonyction speciosum</i> ,	See <i>Ipomœa bona-nox</i> , <i>Linn.</i>

Colophyllum inophyllum, <i>Linn.</i>	उंडी or उंडीण Undi or Undin.
„ spurium	सरपून Sarpún, कालपून Kálpún. (C. Wightianum, <i>Wall.</i>)
„ tomentosum, <i>Wight.</i>	पून Pún, पुनई Punai.
Calosanthos indica.....	See Oroxylum indicum.
Calotropis gigantea, <i>R. Br.</i> ...	मांदार Mándár, अकडा Akrá, रुई Rui, अर्क Arka.
„ procera, <i>R. Br.</i> ...	लालमांदार Lálmándár, तांबडाअकडा Támbará-Akrá.
Calycopteris floribunda, <i>Lam.</i>	बांगूली Bángúli, उक्षी Ukshi.
Calysaccion longifolium	See Ochrocarpus longifolius.
Camellia theifera, <i>Griff.</i>	चाहा Cháhá, चाई Chái.
Camphora officinarum	See Cinnamomum Camphora.
Canarium strictum, <i>Roxb.</i>	धूप Dhúp, गुग्गुळ Guggul.
„ „ (resin).....	काळेडामर Kálédámar.
Caravalia gladiata, <i>D. C.</i>	किसमरी Kismári, अबई Abai (C. ensiformis <i>D. C.</i> , the var. virosa is the wild form.)
„ virosa, <i>W. & A.</i>	कडसंबळ Karsambal, खरशिंगळ Kharshingal, खरसमुळी Kharsamuli.
Canna indica, <i>Linn.</i>	देवकोळी Deokéli, किमुष्कि Kimushki, कामाक्षी Kámákshi, कर्दळी Kardali.
Cannabis sativa, <i>Linn.</i>	भांग Bhang.
„ „ (female flowers)	गांजा Ganjá.
„ „ (resin).....	चरस Charas.
Canscora decussata, <i>Don.</i>	साखवेल Sákhwél.
Canthium didymum, <i>Roxb.</i>	वरसंगी Varsangi.
„ Leschenaultii	चापयेल Chápyel (C. angustifolium, <i>Roxb.</i>)
„ parviflorum, <i>Lam.</i>	कीरणी Kirni.
„ umbellatum, <i>Wight.</i>	उरसूल Ursúl, दूप Túp.
Capparis aphylla, <i>Roth</i>	करील Karil, केरा Kérá, नेपती Népti.
„ brevispina.....	वाघंती Vághanti, गोविंदा Govindá, C. zeylanica, <i>Linn.</i>
„ grandis, <i>Linn.</i>	पचोवांद Pachovánd.
„ horrida, <i>Linn. f.</i>	तरटी Tarti or तरंटी Taranti.
„ pedunculosa.....	कोलिस्ना Kolisna.
„ Roxburghii, <i>D. C.</i> ...	पूर्वी Púrví.
„ spinosa, <i>Linn.</i> (bark).	कबर Kabar (<i>impd.</i>)
Capsicum sp. var.....	लालमिरची Lalmirchi.
Caralluma fimbriata, <i>Wall</i>	मकडशिंग Makarshing.
Carallia integerrima, <i>D. C.</i>	फुनसी Phúnsi.
Cardiospermum halicacabum, <i>Linn.</i>	बोधा Bodhá, शिवजल Shibjal, तेजोवती Tejovati, ज्योतिष्मती Jyotishmati.

<i>Careya arborea, Roxb.</i>	कुंभा Kúmbhá.
„ „ (immature fruit).	वाकुंभी Vákumbhá.
<i>Carica Papaya, Linn.</i>	पोपया Popayá.
<i>Carissa Carandas, Linn.</i>	कारंदा Kárandá, करवद Karavand, हरतुंदी Hartúndi.
<i>Carthamus tinctorius, Linn.</i> ...	कुसुंबा Kusumbá.
„ „ (seeds).	कर्दै Kardai, करडी Kardi.
<i>Carum Carui, Linn.</i> (seeds)...	विलायती जिरें Viláyati jirén.
„ <i>copticum, Benth.</i>	अजवान Ajwán, ओंवा Onvá.
„ <i>nigrum, Roxb.</i> (seeds).	सिअः जिरें Siah jirén.
„ <i>Roxburghianum, Benth.</i>	अजमोद Ajmod. करोंझा Karonzá, रानधणी Rándhani.
<i>Caryota urens, Linn.</i>	भेर्लोमाड Bherlámár.
„ „ (fruit).....	अर्धसुपारी Ardhisupári.
<i>Caryophyllus aromaticus, Linn.</i> (buds).	लवंग Lavang (<i>impd.</i>)
„ „ (fruit).	नरलवंग Narlavang (<i>impd.</i>)
<i>Casearia esculenta</i>	मोडी Mori.
„ <i>graveolens, Dalz.</i>	मोडी Mori, चिल्ला Chillá, बोखाडा Bokhára.
„ <i>laevigata</i>	लैजा Lainjá, मोडमसाई Mormassai, (<i>C. esculenta, Roxb.</i>)
„ <i>tomentosa, Roxb.</i> ...	चिल्ला Chillá, मसाई Massai, करै Karai.
<i>Cassia Absus, Linn.</i>	चिमर Chimar, चाकसू Chaksú.
„ <i>alata, Linn.</i>	दादमर्दन Dádmardan.
„ <i>auriculata, Linn.</i>	तरवड Tarvar.
<i>Cassia Fistula, Linn.</i>	बाहवा Báhavá, गरमाळा Garmálá, बाळकांदरी Bálkánteri.
„ <i>lanceolata, Forsk.</i>	सोनामुखी Sonámukhi, corruption of Suvarnamukhi, Sans.
„ <i>occidentalis, Linn.</i>	हिकळ Hikál, चक्रमर्द Chakramard.
„ <i>pumila, Lam.</i>	सरमल Sarmal.
„ <i>Senna</i>	सुरती भुईतरवड Súratibhuitarvar (<i>C. obovata.</i>)
„ <i>siamea, Lam.</i>	कस्मोद Kasmod.
„ <i>Sophera, Linn.</i>	रानटांकळा Rántánklá.
„ <i>Tora, Linn.</i>	टांकळा Tánklá, कौवरीया Kovariyá, तारोता Tárotá or तरवटा Tarvatá.
<i>Cassytha filiformis, Mill.</i>	आकाशवेल Ákásavel, अंतरवेल Antarvel, आकाशमूली Ákásmúli.
<i>Casuarina equisetifolia, Forster.</i>	} विलायती सरव Viláyatisaro.
„ <i>muricata, Roxb.</i>	
<i>Cedrela Toona, Roxb.</i>	चून Tún, कुडक Kurak.

<i>Cedrus Deodara</i> , <i>Loud</i>	तेल्यादिवदार Teliyá deodár.
<i>Celastrus emarginata</i>	See <i>Gymnosporia emarginata</i> .
„ <i>montana</i>	See „ <i>montana</i> .
„ <i>paniculata</i> , <i>Willd.</i> ...	कांगोणी Kangoni, कंगु Kangu, पिगवी Pigavi.
„ <i>Rothiana</i>	See <i>Gymnosporia Rothiana</i> .
<i>Celosia argentea</i> , <i>Moq.</i>	कुडु Kúdrú or कुंदू Kundrú, मयूरशिखा Muyúrshikhá.
„ <i>cristata</i> , <i>Linn.</i>	राजगिरी Rájagiri, मयूरशिखा vulg. मोरशिखा Mayúrshikhá vulg. Morshikhá.
<i>Celsia coromandeliana</i> , <i>Vahl</i> ...	कुटकी Kutki, कोलहल Kolahal.
<i>Celtis Roxburghiana</i>	ब्रुमज Brumaj.
<i>Centaurea Behen</i> , <i>Linn.</i>	सफेद बहमन Safed Bahman.
„ <i>moschata</i> , <i>Roxb.</i>	शाह पसंद Sháh pasand.
<i>Centipeda orbicularis</i> , <i>Lour</i> ...	नकचिकणी Nakchikni, अफकर Aphkar.
<i>Cephalandra indica</i> , <i>Naud.</i>	तोंडली Tondli, बिंबी Bimbi.
„ „ (wild, bitter).	रान Rán, or कडू Kurú, तोंडली Tondli.
<i>Cerasus Pudum</i>	See <i>Prunus Pudum</i> .
<i>Ceratogynum rhamnoides</i> , <i>Wight.</i>	चिकुडी Chikuri.
<i>Ceratophyllum submersum</i> , <i>Willd.</i> and other pond weeds.	धाकटी शेवाळी Dhakti sheváli.
<i>Cerbera Odallam</i> , <i>Gärtn.</i>	सूकनू Súkanú.
„ <i>Thevetia</i>	See <i>Thevetia nerüfolia</i> .
<i>Ceropegia bulbosa</i> , <i>Roxb.</i>	खप्परकडू Khapparkarú, गायला Gayalá.
„ <i>juncea</i> , <i>Roxb.</i>	कण्वेल Kanvel.
<i>Chamærops Ritchieana</i>	See <i>Nannorrhops Ritchieana</i> .
<i>Chavica</i>	See <i>Piper</i> .
<i>Cheilanthes farinosa</i> , <i>Spr.</i>	पातकुरी Pátkuri.
<i>Chenopodium album</i> , <i>Moq.</i> ...	घाणें Ghánén.
„ <i>ambrosioides</i> , <i>Linn.</i> ...	चाकवत Chákvat चंदनबटवा Chaudanbatvá वासुके Vásukén.
<i>Chikrassia tabularis</i> , <i>Adr. Juss.</i>	पभ Pabh, चिक्रास Chikrás.
<i>Chlorophytum parviflorum</i>	See <i>Anthericum tuberosum</i> .
<i>Chloroxylon Swietenia</i> , <i>D. C.</i> ...	भेरिया Bheriyá, बिल्लो Billo. हळदरवा Halad- ravá.
<i>Chrysanthemum indicum</i> , <i>Linn.</i>	शेवती Shévati.
„ „ (small flowered)	दवणशेवती Davan-shévati, रायशेवती Raishévati, दवणमुलगी Davanmulgi.
<i>Chrysophyllum Roxburghii</i> . <i>Don.</i>	तरसीफळ Tarsiphal, डोंगरी मायफळ Dongri- máypfal.
<i>Cicca disticha</i>	See <i>Phyllanthus distichus</i> .

<i>Cicer arietinum</i> , <i>Linn.</i>	चना Chaná, हरभरा Harbhará.
<i>Cichorium Intybus</i> , <i>Linn.</i>	कासनी Kásni, (<i>impd.</i>)
<i>Cinnamomum Camphora</i> , <i>Nees.</i>	कापूर Kápúr (<i>impd.</i>)
„ <i>Cassia</i> , <i>Blume</i> ...	दार्चिनी or दाल्चिनी Dárchini or Dálchini (<i>impd.</i>)
„ „ (buds)....	काळें नागकेशर Kálé nágkésar (<i>impd.</i>)
„ iners, <i>Reinw.</i> ...	दार्चिनी Dárchini तज् Taj कुरफा Kurfá.
„ <i>Tamala</i> , <i>Nees.</i> ..	तमाला Tamálá.
„ „ (leaves),	तमालपत्र Tamálápatra.
<i>Cissampelos Pareira</i> , <i>Linn.</i>	पाहारवेल Pahárvél, पाहारमूळ Páhármúl.
<i>Cissus</i>	See <i>Vitis</i> .
<i>Citrullus Colocynthis</i> , <i>Schrud.</i>	इंद्रायण Indráyan, इंद्रफळ Indraphal, इंद्रवारुणी Indravárúni, कुडूवुंदावन Kurúrundavan.
„ <i>vulgaris</i> , <i>Schrud.</i>	कलिगड or कलिगण Kálingar or Kalingan.
„ „ (watermelon)	
„ „ var.....	दिलपसंद Dilpasand.
<i>Citrus aurantium</i> , <i>Linn.</i>	नारिंगी Náringi.
„ <i>decumana</i> , <i>Willd.</i>	पपनस Papanas.
„ <i>Limonum</i> , <i>Linn.</i>	लिंबू Limb ú.
„ <i>medica</i> , <i>Linn.</i>	महालुंग Mahalung, जांभीर or जांबीर Jámhbhir or Jambir.
„ „ var. <i>acida</i> , <i>Linn.</i>	अंबडनिंबू or लिंबू Ambat nimbú or limbú
<i>Clausena heptaphylla</i> , <i>W. & A.</i>	करणफळ Karanphal.
<i>Clematis triloba</i> , <i>Heyne.</i>	मोरवेल Morvel.
<i>Cleome felina</i> , <i>Linn.</i>	सुवर्णक्षीरी Suvarnakshiri.
„ <i>viscosa</i> , <i>Linn.</i>	कानफुटी or कानफोडी Kánphuti or kánphori, पिवळी तिळवण Pivali-tilavan.
<i>Clerodendron inerte</i> , <i>R. Br.</i> ...	रानजाई Ránjai, कोयवेल Koivél.
„ <i>infortunatum</i> , <i>Linn.</i>	भांडीर Bhándir करी Kari.
„ <i>phlomoides</i> , <i>Linn.</i> ...	ईरण Iran or ऐरण Airan.
„ <i>serratum</i> , <i>Spr.</i>	भारंगी Bháringi.
„ <i>Siphonanthus</i> , <i>R. Br.</i>	भारंगी Bháringi.
<i>Clitorea Ternatea</i> , <i>Linn.</i>	कजली Kájali गोकर्णी Gokarni सुपली Supli.
<i>Clypea Burmanni</i>	See <i>Cyclea Burmanni</i> .
<i>Cnidium diffusum</i>	See <i>Seseli indicum</i> .
<i>Coccinia indica</i>	See <i>Cephalandra indica</i> .
<i>Cocculus Leceba</i> , <i>D. C.</i>	गुडूची Gudúchi.
„ <i>macrocarpus</i> , <i>W. & A.</i>	वटवेल Vatvel राम्रिक Rámrik, cor. of रामरक्षा Rámrakshá वाटोली Vátoli.
„ <i>villosus</i> , <i>D. C.</i>	वसनवेल Vasanvél पारवेल Parvel दान Tán.

Cochlospermum Gossypium, D. C.	गंनेरी Gannéri, गुंगलाय Gunglai.
Cocos nucifera, Linn.....	नारळी माड Narali-már.
Coffea arabica, Linn.....	काहवा Kahva, बून Bún.
Coix barbata, Roxb.	वरीवल Varival.
„ lacryma, Linn.....	रानजोंधळा Ránjondhalá, रानमकाय Ránmaka.
„ „ (Seed).....	कस्सेइबीज Kassaibij.
Colchicum, sp.	गोडसुरिंजान् Gorasurinján.
„ „	कडू सुरिंजान् Karú surinján.
Coldenia procumbens, Linn. ...	त्रिपक्षी Tripakshi.
Colebrookia ternifolia	भामिनी Bhámini. (C. oppositifolia, Sm.)
Coleus aromaticus, Benth.....	पानाचा ओवा Pánáchá onvá.
Colocasia antiquorum, Schott.	अळू Alún, अळवीण Alvin.
„ „ (several var.)	कांसाळवत Kánsálvat, कांसाळू Kánsálú.
	तेरें Teré, तेरेअळू Téréalú, मांड Mánd or मांडी Mándi.
Colubrina asiatica, Brogn.....	गुटी Gúti.
Combretum ovalifolium, Roxb.	झल्लोसी Jellosi, माधवेल Mádhvel, वेडेधाऊस Vérédhaus.
„ Wightianum.....	पीलोख Pilok, (C. extensum, Roxb.)
Commelyna communis, Linn...	केनी Kéni, चिरोटी Chiroti, निळी Nili.
Conium maculatum, Linn (fruit)	कीर्दमाना Kirdamáná (impd.)
Connarus monocarpus, Linn...	सुंदर Sundar.
Conocarpus latifolia.	See Anogeissus latifolia.
Conocephalus niveus, Wight...	कापुसी Kápusi, करगूल Kargúl.
Convolvulus arvensis, Linn.	हरणपग Hiranpag.
(gum resin)	
„ Scammonia, Linn.	सकमुनिया Sakmúniyá (impd.)
Cookia punctata, W. & A. ...	वांप्पी Vámppi.
Coptis Teeta, Wall. (root)...	मामीरान Mámirán (impd.)
Corallocarpus c o n o c a r p a ,	महादेवी Máhádevi, शिवलिंग Shivaling.
Hook. f.	
„ epigæa, Hook. f. ...	कडवीनाई Karvinái.
Corchorus Antichorus, Rousch	बहुफळी Bahuphali.
„ capsularis, Linn....	चोंचें Chonchén.
„ fascicularis, Lam ...	बहुफळी Bahuphali, हरणखोरी Hirankhori,
	मगरमिठी Magarmithi.
„ olitorius, Linn. ...	चिच Chinch, बनपाट Banpát.
„ trilocularis, Linn....	कडू चिच Karú chinch.
„ „ (seeds).	राजजिरें Rájjirén.
Cordia angustifolia.....	गोंदणी Gondani. (C. Rothii, Rom. et Sch.).
„ latifolia.....	सपिस्तान Sapistán, शेळु Shelú, वरगुंद Vargund.

<i>Cordia Macleodii</i> , <i>H. f. & T.</i> ..	धैवन or दैवन Dhaivan or Daivan.
„ <i>Myxa</i> , <i>Linn.</i>	भोकर Bhokar, शेलवंत Shélvant.
„ <i>Wallichii</i>	धैवन or दैवन Dhavan or Daivan (<i>C. obliqua</i> , <i>Willd.</i> var. <i>Wallichii</i> .)
<i>Coriandrum sativum</i> , <i>Linn.</i> ...	कोथमीर Kothmir, कोथिबीर Kothimbir.
„ „ (fruit)....	धणे Dhané.
<i>Corylus avellana</i> , <i>Linn.</i> (nuts)	फिंदुक Phinduk or Finduk (<i>impd.</i>)
<i>Corypha umbraculifera</i> , <i>Linn.</i> (seed.)	वज्रबटू Vajrabattú, वज्रीवळ Vajrival.
<i>Coscinium fenestratum</i> , <i>Colebr.</i>	झाडीहळद Jhárihalad.
<i>Cosmostigma racemosum</i> , <i>Wight.</i>	जती Jati.
<i>Costus speciosus</i> , <i>Sm.</i>	खुंबारी कांदा Khumbári kándá, पेंवा Penvá, वागचवडा or वागराटी Vágchavrá or Vagráti.
<i>Crataeva religiosa</i> , <i>Forst.</i>	वायवर्णा Vayavarná, हाडवर्णा Hárvarná, रामल Rámalá, कारवन Kárvan.
<i>Cressa cretica</i> , <i>Linn.</i>	खर्डी Khardi, चवेल Chavel.
<i>Crinum asiaticum</i> , <i>Herb.</i>	नागदवण or नागदन Nágdavan or Nágdan.
„ <i>augustum</i> , <i>Roxb.</i>	गायदवण Gaidavan.
„ <i>ornatum</i> , <i>Wight.</i> ...	गदनीकंद or गदांबीकांदा Gadanikand or Gad-ámikándá. (<i>C. longifolium</i> , <i>Roxb.</i>)
<i>Crocus sativus</i> , <i>Linn.</i> (saffron).	केशर Keshar (<i>impd.</i>)
<i>Crossandra undulæfolia</i> , <i>Salisb.</i>	अबोली Aboli, vulg. for आबोली Áboli.
„ „ (flowers).	आबोल or आबोलें Abola or Ábolé.
<i>Crotalaria juncea</i> , <i>Linn.</i>	ताग Táq, सणबीज Sanbij.
„ <i>Leschenaultii</i> , <i>D. C.</i>	डिंगळी or डिंगळ, Dingli or Dingal, दायळी Dayli. खुळखुळडिंगळा Khulkhuldingalá.
„ <i>Notonii</i> , <i>W. & A.</i>	कुळई Kúlai.
„ <i>retusa</i> , <i>Linn.</i>	घाग्री Ghágri.
<i>Croton hypoleucos</i> , <i>Dalz.</i>	पांढरी Pándhari.
„ <i>oblongifolium</i> , <i>Roxb.</i>	घणसूर Ghansúr.
„ <i>sebiferum</i> , <i>Linn.</i>	पिंपळगांक Pipalgánk.
„ <i>Tiglium</i> , <i>Linn.</i>	जमालगोटा Jamálgota, जपाळ or जायपाळ Japál or Jaipál.
„ <i>tinctorium</i> , <i>Burm.</i> ...	सूर्यावर्त Súrýávartha.
<i>Cubeba officinalis</i>	See Piper Cubeba.
<i>Cucumis Colocynthis</i>	See Citrullus Colocynthis.
„ <i>Melo</i> , <i>Linn.</i>	चिबडू Chibúr.
„ „ var <i>utilli ssimus</i> .	तवसी, -शी, or -शीण Tavsi, Tavshi or Tavshin.
„ <i>sativa</i> , <i>Linn.</i>	काकडी Kakari, खिरा Khira.
„ <i>trigonus</i> , <i>Roxb.</i>	कारीट or कारिंट Kárit or Kárint, काटवेल Kátvel.

<i>Cucumis trigonus</i> , var. <i>pubescens</i>	ढकमक or -की, Takmak or Takmaki.
<i>Cucurbita Citrullus</i>	<i>See Citrullus vulgaris.</i>
„ <i>Pepo</i> , <i>D.C.</i>	डांगर Dángar, भोपळा Bhoplá.
<i>Cuminum Cyminum</i> , <i>Linn.</i> ...	सफेदजिरें Sufedjire.
<i>Cupauia canescens</i>	<i>See Hemigyrosa canescens.</i>
<i>Cupressus glauca</i> , <i>Spr.</i>	सरु Sarú.
<i>Curculigo</i>	<i>See Hypoxis.</i>
<i>Curcuma Amada</i> , <i>Roxb.</i>	अमाडा Amádá, काजुरागौरी Kájurágauri.
„ <i>angustifolia</i> , <i>Roxb.</i>	तवकीर Tavkir.
„ <i>aromatica</i> , <i>Salisb.</i>	रानहळद Ránhalad, अंबेहळद Ambéhalad, वेडीहळद Vérihalad.
„ <i>cæsia</i> , <i>Roxb.</i>	नरकचूर Narkachúr.
„ <i>caulina</i> , <i>Grah.</i>	चवर Chavar.
„ <i>longa</i> , <i>Roxb.</i>	हळद Halad, हरिद्रा Haridra.
„ <i>pseudomontana</i> , <i>Grah</i>	सिंदरबर Sindarbar, सिंदरवानी Sindervani.
„ <i>Zedoaria</i> , <i>Roscoe</i> ...	कचोरा or कचोला Kachora or Kachola, <i>C.</i> <i>Zerumbet</i> , <i>Roxb.</i> The name Kachura is often loosely applied to all <i>Curcumas</i> .
<i>Cuscuta reflexa</i> , <i>Roxb.</i>	आकाशवेल Akashvel, अमरवेल Amorvel, अंतरवेल Antarvel, आकाशमूळी Akashmuli, सोनारवेल Sonárvél, सोनवेल Sonvel.
„ <i>sp.</i>	अफतीमून Aftimún (<i>impd.</i>)
„ <i>sp.</i>	कसूस Kasús (<i>impd.</i>)
<i>Cyamospsis psoraloides</i> , <i>D. C.</i>	गोवारी Govári.
<i>Cyanotis axillaris</i>	<i>See Tradescantia axillaris.</i>
<i>Cyathocline lyrata</i> , <i>Cass.</i>	गंगोत्री Gangotri.
<i>Cycas circinalis</i>	मलबारी सुपारी Malabári súpári. (<i>C. Rum-</i> <i>phii</i> , <i>Miq.</i>)
<i>Cyclea Burmanni</i> , <i>Miers.</i>	पाकर Pákar.
„ <i>peltata</i>	परेल Parel, पारवेल Párvél, पारयेल Par-yel.
<i>Cydonia vulgaris</i> , <i>Pers.</i>	<i>See Pyrus Cydonia.</i>
<i>Cylicodaphne Wightiana</i> , <i>Nees.</i>	पेशा Peshá.
<i>Cylista scariosa</i> , <i>Ait.</i>	रानगेवडा Rángevará.
<i>Cynara scolymus</i> , <i>Willd.</i>	किंगिन् Kingin, कुंजीर Kúnjir.
<i>Cynodon Dactylon</i> , <i>Pers.</i>	दुर्वा Durva, हरळ Harala, हरयेली Haryeli.
<i>Cynoglossum canescens</i>	लियाचर्दी Liyachardi (<i>C. Micranthum</i> , <i>Desf.</i>)
„ <i>coelestinum</i>	<i>See Paracaryum coelestinum.</i>
<i>Cyperus bulbosus</i> , <i>Vahl.</i>	ढेगी Thegi.
„ <i>pertenuis</i> , <i>Roxb.</i>	नागरमोथ Nagarmoth, लवाळा Laválá.
„ <i>rotundus</i> , <i>Linn.</i>	मुस्ता Mustá, मोथा Mothá, बीबल Bimbal. The name Bimbal is applied loosely to many kinds of <i>Cyperus</i> .

<i>Dædalacanthus purpurascens</i> <i>T. Anders.</i>	गुलशाम Gulshām.
<i>Dædalia gibbosa</i>	करंबी Kerambi.
<i>Dæmia exténsa</i> , <i>R. Br.</i>	उतरण Utaran, उतरणी Utarni.
<i>Dalbergia lanceolaria</i> , <i>Linn.</i>	दंडूस Dandús, हरानी Haráni, गेंगरी Gengri.
„ <i>latifolia</i> , <i>Roxb.</i>	ताली Táli, ताकोली Tákoli.
„ <i>ougeinensis</i>	<i>See Ougeinia dalbergioides.</i>
„ <i>paniculata</i> , <i>Roxb.</i>	पासी or फासी Pási or Phási
„ <i>Sisso</i> , <i>Roxb.</i>	शिसू Shisú, शिशपा Shishapá.
„ <i>sympathetica</i> , <i>Nimmo.</i>	पेंदगुळी Pentgúli, टिटाबळी Titábli, यकयेल Yekyel.
„ <i>volubilis</i> , <i>Roxb.</i>	अलाई Alai, मुंगणवेल Múnganvel.
<i>Daphne Mezereum</i> , <i>Linn.</i>	माझीरीयून Mázeriyún.
„ <i>oleoides</i> , <i>Schreb.</i>	पेच Pech.
<i>Datisca cannabina</i> , <i>Linn.</i>	अकलबीर or अकलबर, Akalbir or Akalbar.
<i>Datura alba</i> , <i>Linn.</i> & <i>fastuosa</i> .	कांटेधोतरा Kánte dhotará, धत्तुरा Dhattúra.
„ <i>Stramonium</i> , <i>Linn.</i> var. <i>Tatula</i> (fruit.)	घरभुली Gharbhúli (<i>impl.</i>)
<i>Daucus Carota</i> , <i>Linn.</i> (fruit)	गाजर Gájar.
<i>Decaneuron microcephalum</i> ...	<i>See Lamprachænium microcephalum.</i>
<i>Delphinium denudatum</i> , <i>Wall.</i>	जदवार Jadvár (<i>impl.</i>)
„ <i>Zalil</i> , <i>Aitch. & Helm.</i>	त्रायमाण Tráyámán, अस्पक Asprak, गुलजलील Guljalil.
<i>Dendrobium Pierardi</i>	पत्रिक Patrika. (<i>D. Lawauum</i> , <i>Lindl.</i>)
<i>Desmodium gangeticum</i> , <i>D. C.</i>	सालवण Sálvan, डाय Daye, शालपर्णी Salparni.
„ <i>recurvatum</i>	रानगांजा Rángánjá, (<i>D. laxiflorum</i> , <i>D. C.</i>)
„ <i>triflorum</i> , <i>D. C.</i> ...	रानमेथी Ránmethi.
„ <i>triquetrum</i> , <i>D. C.</i>	काकगांजा Kákgánjá.
<i>Dichopsis elliptica</i> , <i>Benth.</i>	पांचोटी Pánchoti, पल्ला Pallá.
<i>Dichrostachys cinerea</i> , <i>W. & A.</i>	सिगमकाटी Sigamkáti.
<i>Digera arvensis</i>	<i>See Achyranthes alternifolia.</i>
<i>Dilivaria ilicifolia</i>	<i>See Acanthus ilicifolius.</i>
<i>Dillenia pentagyna</i> , <i>Roxb.</i>	करमल Karmal, कनगल Kanglú, करमवेल Karamvel, धाकटाकनगल Dhakta-kanglú.
„ <i>speciosa</i>	मोठे करमल Mothe Karmal, (<i>D. indica</i> , <i>Linn.</i>)
<i>Dioscorea aculeata</i> , <i>Roxb.</i>	कांटेकांगी Kántekángi, कणगर or कणगी Kangara or Kangi.
„ <i>bulbifera</i> , <i>Linn.</i>	कडूकरंदा or कडवाकरंदा. Karúkarandá, or Karvá karandá.
„ <i>oppositifolia</i> , <i>Roxb.</i> ...	मांड Mándá, पाशपोळी Páshpoli.
„ <i>pentaphylla</i> , <i>Willd.</i> ...	उलसी Úlsi, शेंडवेल Shendvél.

<i>Dioscorea sativa</i> , Willd.....	कोनफळ Konphal, चिना, Chiná.
„ <i>tomentosa</i> (?) perhaps, a variety of <i>D. pentaphylla</i> .	चायेन or चाईन, Cháyen or Cháin.
„ <i>triphylla</i> , Willd.....	मांड Mándá
<i>Diospyros assimilis</i> , Bedd.....	मुल्लीय Mulliya.
„ <i>chloroxylon</i> , Roxb.	निनै Ninai.
„ <i>exculpta</i>	टेंबुर्णी Temburni, माकंडखिडी Mákarkhin (<i>D. Embryopteris</i> , Pers.)
„ „ (roots)	अक्षतेचें खोड Akshatéché Khor.
„ <i>melanoxylon</i> , Roxb.	तेंडू or तिंडूक, Tendú or Tindúka.
„ <i>montana</i> , Roxb.....	गोविंदु Govindu, लोहारी Lohári.
„ sp. var.....	आबनूस Ábuús. (<i>impd.</i>) <i>Ebony</i> .
„ <i>Tupru</i> , Ham.....	तरतर Tartar.
<i>Dipterocarpus turbinatus</i> , <i>Gártm.</i> (balsam).	गरजनेल Garjanel.
<i>Dodonaea Burmanniana</i>	जखमी Jakhmi. (<i>D. viscosa</i> , Linn.)
<i>Dolichandrone falcata</i> , Seem...	मेढाशिंगी Medhashingi, मरशिंगी Marshingi.
<i>Dolichos biflorus</i> , Linn.....	कुळिथी Kulithi.
„ <i>Lablab</i> , Linn.	वालपापडी Valpápari, पांटी Pánti, आवडी Avr
„ „ var.	घेवडा Ghevará.
„ <i>sinensis</i>	See Vigna Catiang.
<i>Dorema Ammoniacum</i> , Don (gum.)	फेशुक Feshuk, उशक Ushak (<i>impd.</i>)
„ „ (root)....	बोई Boi (<i>impd.</i>)
<i>Doronicum pardalianches</i> , Linn (rhizome)	दारुणजे अक्रबी Dárúnajé akrabi (<i>impd.</i>)
<i>Dregea volubilis</i> , Benth.....	अंब्री Ambri, हरणदोडी Hirandori.
<i>Dryobalanops Camphora</i> , <i>Colebr.</i> (Bhimsemi camphor)	भीमसेनी कापूर Bhimseni kapúr (<i>impd.</i>)
<i>Dysoxylum binectariferum</i> , <i>Hook. f.</i>	बुरुंबी Burúmbi or बुरम Buram.
<i>Ecballium Elaterium</i> , A. Rich. (fruit).	कांटेरी इंद्रायण Kánteri indráyan.
<i>Ecbolium Linneanum</i> , Kurz....	रानआबोली Rán aaboli, धाकटा अडुळसा Dhákta adulsa.
<i>Echinops echinatus</i> , D. C. ...	कांटेचुंबक Kántéchubak.
<i>Echium</i> sp. (leaves and flowers)	गौझवान Gaozabán (<i>impd.</i>)
„ „ (?) rhizoma.....	रतनजोत Ratanjot (<i>impd.</i>)
<i>Eclipta alba</i> , Hassk.....	बंग्रा or बंग्राज Bangra or bangráj, माका or मा- कडी Máká or mákri.
<i>Ehretia buxifolia</i> , Roxb.....	पाला Pálá.
„ <i>laevis</i> , Roxb.....	दातरंग Dátrang.

<i>Elceagnus Kologa</i>	नरगी Nargi, आंबगूल Ámbgúl, (<i>E. latifolia</i> , <i>Linn.</i>)
<i>Elæocarpus Ganitrus</i> , <i>Roxb.</i>	रुद्राक्ष Rúdráksh.
„ <i>oblongus</i> , <i>Gärtn.</i>	कास Kás, कास्सो Kásso.
„ <i>robustus</i> , <i>Roxb.</i>	जलपाई Jalpai.
<i>Elæodendron glaucum</i> , <i>Pers.</i>	भुतापाला Bhutápálá, तामरुज Támruj, (<i>E. Roxburghii.</i>)
<i>Elephantopus scaber</i> , <i>Linn.</i>	पाथरी Páthri.
<i>Elettaria cardamomum</i> , <i>Maton.</i>	वेलदोडे Veldore, एलची Elchi.
<i>Eleusine coracana</i> , <i>Gärtn.</i>	नाचणी Náchni, नागली Nágli रागी, Rági.
<i>Embelia Busaal</i>	बरबटी Barbati, जोंधळी Jondhli, अंबटी Ambti. (<i>E. robusta</i> , <i>Roxb.</i>)
„ <i>ferruginea</i> , <i>Wall.</i>	अंबटबरबटी Ambat-barbati.
„ <i>Ribes</i> , <i>Burm.</i>	वावडिंग Váváring, करकनी Karkani, बाबिरंग Bábiring.
<i>Emex</i> sp. (plant).....	शुकाई Shukai (<i>impd.</i>)
<i>Emilia sonchifolia</i> , <i>D.C.</i>	साधीमंदी Sádhimandi.
<i>Enicostema littorale</i> , <i>Blume.</i> ...	ममीज्वा Mamijvá, नाईचापाला Naichápálá.
<i>Entada Pursætha</i>	गारंबी or गारभी, Gárambi or Gárbhi, गरदल Gardal, (<i>E. scandens</i> , <i>Bth.</i>)
<i>Ephedra Alte</i> , <i>C. A. Meyer</i> ...	लसतुक Lastúk.
„ <i>vulgaris</i> , <i>Linn.</i>	होम Hom of the Parsees, supposed to be the same as the Soma of the Vedas (<i>impd.</i>)
<i>Epicharis exarillata</i>	See Amoorá Lawii.
<i>Epicarpurus orientalis</i>	See Streblus asper.
<i>Eranthemum pulchellum</i>	See Dadalacanthus purpurascens.
„ <i>roseum</i> , <i>Br.</i>	रान आबोली Rán áboli, दशमुळी Dashmuli, तांबडी कोरांटी Tambri-koránti.
<i>Eragrostis cynosuroides</i> , <i>Rom. & Sch.</i>	दर्भ Darbha.
<i>Erigeron asteroides</i> , <i>Roxb.</i>	मरेडी Marédi, सोंसळी Sonsali.
<i>Erinocarpus Nimmoanus</i> , <i>Grah</i>	चेरा Cherá, चौरा Chourá.
<i>Eriocaulon sexangulare</i> , <i>Linn.</i>	मारगुंदिया Mārgundiya.
„ <i>setaceum</i>	गोंदळी Gondali.
<i>Eriolæna Candollei</i> , <i>Wall.</i>	बोटकू Botkú, अरंग Arang.
„ <i>Hookeriana</i> , <i>W. & A.</i>	बूटी Búti, बोटकू Botkú.
<i>Eriodendron anfractuosum</i> , <i>D. C.</i>	शाल्मली Shálmali, शमीरीदा Shamiridá, भुजरी धामण Bhújridháman.
<i>Ervum Lens</i> , <i>Linn.</i>	मसूर Masúr.
<i>Erythraea Roxburghii</i> , <i>G. Don.</i>	लन्टक Lantak.
<i>Erythrina indica</i> , <i>Roxb.</i>	पांगरा Pángará, पारंगा Párangá.
<i>Erythroxylon indicum</i> , <i>Bedd.</i>	देवदार Deodár.

<i>Eugenia aquea</i> , <i>Burm.</i>	ठिकजांभूळ Tikjāmbhúl.
„ <i>caryophyllcea</i> , <i>Wight.</i>	जंगली लवंग Jangli lavang, रानलवंग Rān lavang.
„ <i>Jambolana</i> , <i>Lam.</i>	जांभूळ or जांभूळी, Jāmbhúl or Jambhúli.
„ <i>Jambos</i> , <i>Linn.</i>	जांबा or जांभा, Jāmba or Jāmbhá, साखरजांभ Sākarajambha.
„ <i>lanceolaria</i> , <i>Roxb.</i>	धाकटी शेरण Dākti-sheeran.
„ <i>lissophylla</i> , <i>Thwaites.</i> ..	पानजांभूळ Pānjāmbhúl.
<i>Eulophia bicolor</i> , <i>Dalz</i>	अंबरकंद or अमरकंद Amberkand or Amarkand.
<i>Eupatorium Ayapana</i> , <i>Vent.</i> ...	आयापान Áyápán.
„ <i>divergens</i>	See <i>Vernonia divergens</i> .
<i>Euphorbia antiquorum</i> <i>Linn</i> ...	नरसेज Narsej.
„ <i>hirta</i>	दुधी Dudhi, नायटी Náyati, (<i>E. pilulifera</i> , <i>Linn</i>)
„ <i>neriifolia</i> , <i>Linn</i>	निवडूंग Nivarāng, निवलकांटें Nivalkānté, मिणगुद Mingut.
„ <i>thymifolia</i> , <i>Burm.</i> ...	नायटी Náyati, धाकटी दुधी Dhāktidudhi, हजारहदाना Hazārdáná.
„ <i>Tirucalli</i> . <i>Linn</i>	शेर Sher, थुवर Thuvar. निवल or-ली, Nival or Nivali.
„ <i>tithymaloides</i> , <i>Willd</i> ..	शेंड Shend, विलायती थुवर Viláyati-tuvar.
„ (gum)	फरबीयून. Farbiyún
<i>Eurya japonica</i> , <i>Thunb</i>	भौरा Bhaunrá, गोंटा Gontá, देवरा Devrá.
<i>Euxolus polygamus</i> , <i>Moq</i>	चुलाई भाजी Chúlai bháji.
<i>Evolvulus hirsutus</i>	शंखवेली Shankhaveli, (<i>E. alsinoides</i> , <i>Linn.</i>)
<i>Exacum bicolor</i> , <i>Roxb</i>	उदीचिरायत Udichiráyat.
„ <i>pumilum</i> , <i>Griseb</i>	जटाली Jatáli.
<i>Excæcaria Agallocha</i> , <i>Willd.</i> ...	गेवा Gévá, फुंगली Phungali, सुरुंड Surúnd.
„ <i>baccata</i> , <i>Müll.</i>	कीरद Kirad.
„ <i>insignis</i> , <i>Müll-Arg.</i> ..	उरो Uro.
<i>Fagonia mysorensis</i>	धमासा Dhamásá (<i>F. arabica</i> , <i>Linn.</i>)
<i>Farsetia ægyptiaca</i> , <i>Turr.</i> ...	फरीद-बूटी Farid-búti.
<i>Feronia elephantum</i> , <i>Corr.</i> ...	कवठ or कविठ, Kavath or Kavith.
<i>Ferula alliacea</i> , <i>Boiss.</i>	हिंग Hing (<i>impd.</i>)
„ <i>galbaniflua</i> , <i>Boiss.</i> ..	बिराझ Biriz (<i>impd.</i>)
„ (gum-resin.)	
„ <i>Narthex</i> <i>Boiss.</i> (gum-resin.)	हिंगडा Hingrá.
„ sp. (gum-resin)...	सगबीनज Sagbinaj.
<i>Ficus asperima</i> , <i>Roxb.</i>	खरवट or-टी Kharvat or Kharvati.
„ <i>bengalensis</i> , <i>Linn.</i>	वड Var, वडी Vari.
„ <i>Carica</i> , <i>Linn.</i>	अंजीर Anjir.
„ <i>cordifolia</i> , <i>Roxb.</i>	पैरी or पायरी Pairi or Payri, अष्ट Ashta.

<i>Ficus dasycarpum</i> , <i>Lam.</i>	भुरवड Bhurvar.
„ <i>demonum</i>	धेडुंबर Dher-umbar, बोखेडा Bokherá, गंड्या- उंबर Gándyáumbar, काळाउंबर Káláumbar (<i>F. hispida</i> , <i>Linn. f.</i>)
„ <i>glomerata</i> , <i>Roxb.</i>	उंबर Umbar, उदुंबर Udumbar.
„ <i>infectoria</i> , <i>Willd.</i>	बस्तारी Bassári, पाकडी Pákari, उखळी Ukhali, लेंदवा Lendvá.
„ <i>religiosa</i> , <i>Linn.</i>	पिपळ Pipal, अश्वत्थ Ashvatha.

(*To be continued.*)

THE HORSE: A ZOOLOGICAL STUDY.

By J. H. STEEL, A.V.D.

In whatever way we look at horses they are of interest and instruction. We may approach them with the critical eye of the horseman skilled in the judgment of shape, action, and pace; of the veterinarian, distinguishing the sound from the unsound; of the humanitarian, viewing with interest one of the most valuable quadrupedal friends of man. Or, again, we may approach from another point, and view the natural history relations and bearings of the noble animal, his zoological characters and affinities, and his comparative anatomy. Seen as a member of the zoological tree, the horse yields to none in the interest of the considerations it suggests to us, some of which I hope to touch on superficially this evening.

Hippology has not yet become a distinct science, but we have sufficient material at our disposal to render it so; and Xenophon probably had the intention of making a knowledge of the horse a polite study, and temporarily succeeded in doing so among the circus-loving patricians of Greece by his work on Hippologia. A Hippological Association would be out of place nowhere in the British Empire; for, somehow or other, horse racing, hunting, and the like, follow the Union Jack just as cricket does. The study of hippology from its severest and most recondite aspects has been pushed with some vigour in Germany, France, Italy, and the United States. The descent of the horse; his true place in nature; the true homology of his foot; the comparison of fossil horses, and of those of Grecian, Assyrian, and primitive art, with the horses of the present day; the strict comparison of living horses now found and their arrangements in species, races, varieties, &c., have been followed out especially by Owen in England, Gaudry in France, Rutimeyer in Germany, Kowalewski in Austria, Count

Ercolani in Italy, and Marsh and Cope in America. The results obtained by these observers and philosophical investigators of the past and of the present constitute a mass of knowledge which, if it has not yet thoroughly settled down into a well-defined stratum of scientific information, promises to consolidate into a concrete and instructive mass of science under the term hippology.

But there is a more practical branch of this science of the future (if I be permitted to call it so) which appeals to a much larger class than scientists pure and simple. In all parts of the world the horse-supply question is becoming a very large one, and presenting problems which require to be solved by those who have made the study of it a special science. The influences of artificial selection and natural causes on the form and utility of the horse is a phenomenon which we all have constantly under our eyes in Bombay, where the Arab, an Oriental horse, meets his Occidental cousin from England or Australia, and where indigenous horses (Country-breds), Turcomans, Persians, and even Burmans, are constantly to be seen and compared as to shape, value for work, and suitability for the climate.

One of the most remarkable phenomena of the last fifty years is the changes which have taken place in the distribution and nature of horses during that time. In England the thorough-bred is constantly undergoing change (in some respects not for the better), the weight-carrying hunter is becoming replaced by much lighter horses, and the older race of horsemen regret the degeneracy of horses in the present day; we still constantly hear of the falling off in horse-breeding throughout England and Ireland, and often of extinction of useful breeds, such as the Suffolk Punch, and yet we find our troops and batteries well horsed, our race horses well to the front as usual, our thorough-breds bought for high prices, because foreigners can produce none like them, and our horses "stay" in the field as well as ever, in spite of the pace in hunting having decidedly become faster of late years. Excluding the feeble attempts of the French and others to imitate the British Turf, the efforts of the Continental nations are directed almost entirely to the adaptation of the horse to war purposes. The colossal studs of Germany, Italy, France, Austria, and Russia constitute a drain on the resources of those countries which, like the conscription, has happily not yet extended to England, and from which India, with no slight effort, set herself free. On the southern and eastern outskirts of

these great nations are found horses which, like their owners, have by less conscious efforts of artificial selection, indeed almost by survival of the fittest, become typical light cavalry horses, hardy, active, fleet, and fearless. The varieties of the Arab along Northern Africa and Southern Asia, from Algeria to Hyderabad (Deccan), the Cossack horse in Southern Russia, and the Turcoman in Central Asia, and extending southwards into India, are the semi-natural races now referred to. Further east we come to the zone of ponies of Indo-China and Australasia, of which the Burma or "Pegu" is an example—an essentially natural race of great hardihood, robust physique, but small size and indomitable pluck. Australia, the Americans, and the Cape show us the phenomenon of horses becoming highly specialized by the combined influences of new climate, special management, and artificial selection. Compare the Waler with the English horse, whether in shape, temper, or suitability for special work, and you will see how special influences have affected the race of horses in the colonies quite as much as they have the men. The most conspicuous example of the effects of artificial selection on the horse is the American Trotter, a grand breed with beauties of "make" and powers wholly its own, developed by Yankee energy and skill from the English thorough-bred race-horse. But I must not allow myself to be carried away by this fascinating branch of my subject. I must now point out to you that the working horse of North America, the pampas semi-wild horse of South America, the valuable "Waler," and the horses of New Zealand and the Cape are examples of diffusion of the European horse throughout the world, principally the outcome of the last half century. What an extraordinary expansion of the area occupied by the horse! This would prove an interesting study for a member of the Statistical Society, but would be out of place here.

I go on to the horses of the far distant past. Cuvier used to say that from a fragment of bone he could build up the skeleton of an animal, and he could actually do so, to an extent. A veteran *savant* of Great Britain, the illustrious Owen, has informed us from fossils what the horse of the past was like. I exhibit an enlarged copy of his diagram, from which it will be seen that his materials to work with were a few bones and teeth. He traces clearly the process by which the three-toed horse became the one-toed horse of the present day, and gradually lost the first molar in the course of time occupied in these changes. It is insisted that

here we have an actual and paleontologically proved descent in the course of geological time, *i.e.*, since the upper Eocene. A remarkable confirmation of this has been contributed from America, and is well illustrated by Marsh's diagram, a copy of which I now exhibit, together with Oscar Schmidt's table showing the connection between the odd-hoofed animals. We may look at these diagrams and allow our fancy to summon before our mind's eye the time when the ancestors of our present horses roamed over the marshy plains of the continent of the old world, and were prevented by their side toes from sinking in the mud, just as are the tapirs and rhinoceroses of the present day. We may fancy that the rude pictures found carved by our own remote ancestors (on the shin bones found in fossiliferous caves) of horses and mammoths give us some insight of what these horses of the past were like, and, with Göethe, we may critically look on the vigorous representations of Grecian horses on the frieze of the Parthenon, and observe that they are not like the war horses of the present day, they present anatomical indications of their being but semi-tamed and wholly natural and unartificial in development. But we must leave the domain of speculation and return to that of careful deduction! Marsh, Cope, and others have clearly proved a series of hippoid, horse-like, creatures on the slopes of the Rocky Mountains in the Upper Tertiaries; and yet when the Spaniards landed in America the horse was an unknown creature, the mounted warrior was, like the ancient Centaur, worshipped as a god! The equine animals of America had from some cause, which is at present a profound mystery, disappeared from the continent of America. Events since the discovery of the New World have tended to make this fact still more remarkable, for it has been found that both North and South America are particularly favourable to development and increase in number of horses. The question which here arises for solution in the futuro is, Whether the hippoid animals of Marsh were actually ancestors of horses, or rather had not mammalian development been going on on parallel lines in the old world and the new, Marsh's hippoids in America "vicariating" for horses, as llamas do for their close allies the camels, and as marsupials in the Australasian region long did for mammals of the higher orders in most parts of the world? Materials are not yet available for solution of this problem. In spite of these doubts, the value of the facts which have been ascertained concerning the descent of the horse to zoological science is proved by Oscar Schmidt's statement, that "no

other mammals in the present day can show so distinct or regular a pedigree as the horse."

Teratology, the study of so-called monstrosities, gives us some curious results which are worth a short consideration in this connection. Horses are not uncommonly born with three toes on one or more of their feet. An example of this "recurrence to original type" is shown in the diagram now exhibited. Horses of low breed are especially liable to this peculiarity. History tells us that Bucephalus, the celebrated charger of Alexander the Great, was a Hipparion, *i.e.* had three toes on each foot. The tomb of this horse is on the north-western frontier of India and is well known. Whether the bones of Bucephalus still lie in it or no I am not in a position to state; but if antiquarians at any time get an opportunity of exploring the contents of this tomb, I trust that any equine remains will be submitted to examination by a competent hippologist. I also trust that the desideratum will be made widely known, in order that, if they be not already lost, the bones of Bucephalus be preserved with due honour. The results of Teratology go further—they show us that at times horses cloven-footed, like oxen, occur; that horses are sometimes found with small frontal horns; and that frequently the limb bones of the horse very closely resemble those of the ox. Natural and ordinary development shows that the fibula of the horse enters into formation of the hock joint, and that the ulna extends down to the knee, and these are facts which few zoologists know. I once had a humerus of the horse, of the large black Belgian breed used by undertakers in England, which even well-informed students in veterinary anatomy used to constantly mistake for that of a bullock. These anatomical and teratological facts by no means alter our accepted ideas as to the degree of relationship of the horse and the ox, but they are indications of similarity in function; in plain words, that the horse and ox, since they walk and run to an extent in the same way, have their limbs very similar. *They further give colour to the suspicion held by veterinary anatomists, in opposition to the views at present generally accepted among zoologists, that in the days before the Anchitherium, fusion between the third and the fourth fingers occurred to produce the large central toe of the horse.* This heresy will, no doubt, give a shock to some of my hearers who have been led to believe that the functional digit of the horse is No. 3, enormously enlarged, and that all the other digits have disappeared or are in course of disappearance. I

cannot enter into detail here, but I must ask you to accept my statement that facts and observations are becoming multiplied to such an extent as to cause the hitherto accepted view to totter and to need its defenders to rally round it. Suffice it for us now to look upon the foot of the horse as a great scientific bone of contention in the future and a most beautiful piece of mechanism which ensures our horses treading firmly and progressing rapidly in the present. There are some horny portions of the limbs which are less interesting practically than the hoofs, but equally instructive and curious to the enquiring mind. The little knot of horn in the fetlock termed the Ergot is considered to be a remnant of the hoofs of the two digits represented by the splint bones. This little organ is rudimentary, *i. e.*, of no known use in the present day, and it is only found in the coarser breeds of horses. Another relic of the past, an organ in process of disappearance, is that piece of horn inside the forearm, where it is termed the Chestnut, and that inside the hock, where it is termed the Castor; it corresponds to the finger nail of the thumb of our hand and of the foot of the five-toed ancestor of the horse in the very remote past.

A lecturer on the processes of change going on in the body of mammals, whereby variation is brought about, could find no structure better illustrative of the phenomena to be described than the limbs of the horse. "Convergence," that is, similarity produced by similar uses, would be illustrated by comparing the fore limbs with the hind; "divergence" by showing how these two parts differ. The sesamoid bones of the fetlock and the navicular bone show how new bones appear and gradually increase in importance; and the splint bones, fibula and ulna, indicate the several ways in which bones disappear. *i. e.*, by degeneration, ankylosis, fusion, and developmental absorption. The shoulder girdle of the horse is a specially interesting study in comparative anatomy; of the typical three elements, scapula, coracoid, and clavicle, the former is remarkably well developed, the coracoid has degenerated into a single process of the scapula, and the clavicle has become but a fibrous band in the substance of the muscles running from the neck to the shoulder. It is a fact not known to zoologists in general that the horse has distinct indications of a clavicle, and that it is not rare to find in him rudimentary clavicular muscles. The spine of the horse is in a singular state of unrest. There is not one of its five regions that has always the same number of bones. This is a most remarkable

fact and a most significant one, and, I may add, one on which zoologists have not hitherto laid sufficient stress. Darwin has taught us how much may result from individual variety and specific variation, and he could nowhere have found it better marked than in the spine of the horse. It will be sufficient if I here state that I have proved it is not unfrequently seen that the seventh cervical vertebra in the common English ass has on each side a well-developed rib connecting it with the sternum; thus this animal is, in fact, the extraordinary phenomenon of a mammal with but six cervical vertebræ. The bones of the back vary in different cases from 17 to 19; of the loins the number of bones is extremely uncertain, ranging from 5 to 7; the sacrum consists of 5 or 6, and the number in the coccyx is quite uncertain, but it has been observed that the tail in well-bred horses is becoming shorter—a fact which may comfort members of the Society for the Prevention of Cruelty to Animals with the knowledge that, in the distant future, horses' tails will have become too short to require “docking.” To those who view this subject from an artistic point, and fear lest in the future the horse may lose altogether his beautiful caudal appendage, I may give a word of comfort. Instantaneous photography of horses in motion has proved that the tail has a *raison d'être* as a balancing organ; Nature also will spare it for use as a fly-flapper!

Time will not permit my passing in review the nearest allies of the horse and the various races of equines in different parts of the world. Our country-bred horses show some remarkable indications of relationship with the zebra, donkey, and quagga and other equines who are not caballine. We are constantly speaking of the donkey-stripe of the Kattywar horses and of zebra marks on the knees and hocks of country-breds. The frequency of mouse-colour in country-breds and the constant occurrence of parti-colouration in them are significant in this relation. Another study of equines which would prove specially interesting and of scientific value would be the phenomenon of hybridism as exemplified in the mule, the hinny, and the crosses which have been made from time to time between the horse and the zebra; not to speak of the extraordinary phenomenon which occasionally occurs of mules breeding. These hybrids promise to show to the careful student the laws of transmission of parental qualities; they afford the most practicable opening into this hitherto obscure field of enquiry. Comparative anatomy gives us some information; for example, we find that the

lower hock bones are naturally becoming fixed (natural spavin) and the splint bones are becoming but processes of the large metacarpal (natural splint), but the study of hybrids tends to give us precise information as to how we are to breed the exact sort of horse that we require. It is interesting to observe that horse-breeding, which has hitherto been empirical, is showing signs of becoming a ductive science with a certain amount of exactitude in it. I trust this record of a few thoughts about horses will prove of interest to the Society.

ZOOLOGICAL NOTES.

SNAKE-BREEDING FOR THE GOVERNMENT REWARD.

THE Government of Bombay recently addressed our Society on the subject of the rewards paid for the destruction of poisonous snakes in the districts of Satara and Ratnagiri. The opinion of the Society was solicited on various points, and, amongst others, the question was raised as to whether there was likely to be any truth in the rumours that snakes were frequently bred in confinement by the people, in those districts, for the sake of the Government reward.

The following is an extract from the reply written to Government by Mr. H. M. Phipson, the Honorary Secretary, on 8th June 1887 :—

“ With regard to the last paragraph in your letter concerning the possibility of snakes being bred in confinement for the sake of Government reward, I have no hesitation in saying (and in this Mr. Vidal thoroughly agrees with me) that such a thing is highly improbable.

There are practically only four poisonous snakes, of any consequence, in the districts referred to, Satara and Ratnagiri. *viz.*—

1. The Cobra (*Naga tripudians*).
2. The Gunus (*Daboia elegans*).
3. The Phoorsa (*Echis carinata*).
4. The Krait (*Bungarus arcuatus*), of which the latter is by no means common in those districts.

The Cobra has, to the best of my knowledge, never been known to breed in confinement, and it is exceedingly doubtful whether the Gunus and Phoorsa which are both viviparous, could be successfully propagated except in a most carefully constructed serpentarium.

The rumours respecting the breeding of poisonous snakes are probably founded on the fact that snakes' eggs are frequently picked up by the junglemen, who naturally keep them until they hatch, so as to claim the Government reward in the event of the snakes being poisonous; but this practice is one that should be encouraged.

It is also quite possible that gravid females of the Phoorsa (which is so common in Ratnagiri) have occasionally been kept for a short time after capture in order that the Government reward may be claimed on the young ones as soon as they are born, but there seems to be little or no harm in such a practice."

District Officers frequently refer to rumours regarding the existence of such practices, and as the subject is of interest both to the naturalist and to the economist, the sooner the truth is ascertained the better.

BOOK NOTICE.

The "Marchesa," an auxiliary screw steam yacht of 420 tons, Mr. C. Kettlewell) master and owner, * * * left Cowes on the 8th January (1881) and reached Colombo April 24th, having touched at Socotra and Oolegaum Island (Maldives) * * *. She proceeded via Singapore to Formosa; and so far we have only quoted the author.

In a recent review we had to praise a writer for having written a readable account of the ordinary outward voyage to the East; but Dr Guillemard has adopted a counsel of perfection (given by Horace), ignored a few thousand preliminary knots altogether, and introduced us to the "Marchesa," running in towards the land to reconnoitre a fort at Nansha, the southern extremity of Formosa. This particular fort has deserved from the first, as some of our own Isle-forts do in their old age, the favour even of the Peace Society. For it was erected not for the fracture of heads, but "as a refuge for Shipwrecked Mariners"; in virtue of a treaty concluded in 1867, between General Le Gendre, U. S. Consul at Amoy; and Tok-e-tok, Paramount Chief of the Southern District of Formosa, to both of whom the acknowledgments of mariners are due. For before that; Tok-e-tok's subjects had been in the habit of murdering all strangers on whom they could lay hands, and were more than suspected of eating them.

The "Marchesa" made no experiments upon the improvement in their ways, but passed on to the low island of Samasana, formerly visited by the famous old Samarang; and by the *Sylvia* (1867). Here, however, her party found nothing in our line, but many domesticated Formosan deer (*cervus pseudaxis*) creatures looking like a cross between the English red-deer and our "chital." It will strike a familiar chord in the heart of every microfossilite reader to find that here, in what our author calls "the ultimate of Ultima Thules," he was waylaid on his return to his boat, and compelled to *examine the school*, just as he would have been here. Having discharged this duty under the slight difficulty caused by his not knowing the Chinese alphabet quite so well as the junior first form did, he sailed for Chock-e-day.

The virtue of the land of Chock-e-day, which is on the East Coast of Formosa, is that its mountains rise 7,000 feet almost sheer out of the sea, as is well shown

* *The Cruise of the "Marchesa" to Kamschatka and New Guinea; with notices of Formosa, Liu-Kiu, and various islands of the Malay Archipelago.* By H. H. Guillemard, M.A., M.D., &c., &c. London: John Murray, 1880.

in a fine illustration. It must be one of the grandest coasts in the world, but there is not much pleasure on it, and no anchorage. A party from the "Marchesa" landed, well armed, and admired the scenery greatly; but saw only one bird (not described) and caught nothing but a snake, 9 feet long (not identified). They saw tracks of deer and wild cats, and on their return to the boats, those of a native who had been dogging them, possibly with a view to dinner. After which, the surf having risen, they had to swim off to their boat with the aid of a life-belt and line; and made no further attempt to inspect Eastern Formosa, which is entirely in the hands of inhospitable and probably Cannibal savages, and likely to remain so for some time yet.

They therefore proceeded to the comparatively civilized portion of the island colonized by the Chinese, landed at Ke-lung, and went overland (partly by river) to Tamsui; remarking, chiefly, the great variety and beauty of the bamboos, a thing worth noticing, as these ports lie under the 26th degree N. L. Dr. Guillemard observes that *Aralia Papyrifera*, the plant whose pith furnishes what we somewhat perversely call "rice-paper," is peculiar to Formosa, "a fact not generally known." He notes that the lofty eastern mountains of the island, catching the rainstorms of the Pacific, make it "a sort of umbrella for the eastern coasts of China"; and that the *detritus* constantly washed down from them bids fair some day to unite the island to continental Asia.

Tamsui and Ke-lung have been a good deal before the public since the "Marchesa's" visit, in connection with their occupation by the French; and it is not, therefore, necessary to quote here Dr. Guillemard's account of them and their environs. On the whole, he considered Formosa "a very good country to live out of;" and gladly departed for Liu-Kin (which we used to call Loo-choo).

His researches in that archipelago were such as may best be dealt with by our "chum" Society, the Anthropological. The Islands, he says, "still remain an almost virgin ground" in respect of natural history; and he brought no specimen out of them to speak of, except a "large and beautifully iridescent shell (*Arvicula Micropteron*) very rare on the Island, and greatly valued for its beauty." Bird life appears to be exceedingly poor in Liu-Kiu. Of plants he notices pine trees, pink lotus, and "feathery fronds of the tree-fern." It is not easy for the reader to guess whether this last is the same plant noticed a page or two further on as "the stiff-looking Cycas." At any rate, this last is extensively planted, for what purpose we are not told.* The other vegetation mentioned is all sub-tropical. The Islands, at the time of the "Marchesa's" visit, were passing under Japanese dominion, and will probably soon cease to be *terra incognita*.

She sailed from thence to Japan, and here again we have reason to be grateful to Dr. Guillemard for judicious abstention. He really only bestows a line and a half upon the "mousmis"; and a page and a half on the whole country; and leaves the reader to learn "all about it" from the works of people who have seen something more than the hackneyed excursion routes; reserving himself for the almost unknown glories of Kamschatka. With these he made his first acquaintance at Petropaulovsky in Avatcha Bay, memorable chiefly for the fiasco of the naval expedition undertaken against it by the French and English in 1854.

* Probably Sago.

The result of their combined action is still traditionally recorded in the navy in the words of a sailor, too forcible, unluckily, for publication *virginibus puerisque*. At any rate, they got well beaten, but returned next year, and destroyed the place, which the Russians, with their characteristic strategy, had meanwhile abandoned. Dr. Guillemard thinks Avatcha Bay "one of the finest harbours in the world, if not "actually the finest;" but the town of Petropaulovsyk had not at the time of his visit, recovered from its desertion and destruction; and was simply a poor undefended *fur-trade* settlement. Fishing and shooting were good, and amongst other birds our author notices (and figures) two very quaint-looking sea-fowl, the Whiskered Puffin (*Lunda Cirrhata*) and the Tufted Auk (*Simorhynchus cristatellus*). In the latter the frontal crest curves *forward*, giving a strange air of martial swagger to this peaceable little water-fowl.

Ashore, the most remarkable and abundant mammal was the sledge-dog; who outnumbers humanity, in Kamschatka, by about 400 per cent., and is so far master of the situation that "owing to his rapacity, it is impossible to keep sheep, goats, or any of the smaller domestic animals, and Kamschatka is one of the few countries in the world in which fowls are unknown." In mitigation it has to be observed that except when actually at work, these dogs are never, or rarely, fed; and, instead of having kennels, are reduced to *burrowing* for shelter. "A dog's life," says Dr. Guillemard "is here most appropriately realized." To prevent the dogs, when collected for work, from quarrelling, they are picketed one to each foot of triangles of poles arranged like piled rifles; and this although the males are subjected, as pups, to a pacificatory operation.

A party from the "Marchesa" undertook to march overland from Petropaulovsky to the Kamschatka river, and descend the latter on rafts, floated on dug-out canoes of poplar wood; and accomplished this exploration with success. Their account of the interior is, in short, that "every prospect pleases, and only man is vile," especially when well crossed with Russian; the aborigines being, comparatively civil and honest. It is quite clear that the game was not worth the candle, and that nearly all they saw worth seeing could have been better got at by ascending the river from its mouth in their own boats.

They shot one bear and one sable (out of season), many ptarmigan, doubtfully identified as *Lagopus albus* (no specimens were preserved), Ernes (*Haliaëtus albicilla*) Phalaropes (*L. hyperboreus*) and ducks, which our author does not specify, though he appends a list of Kamschatkan birds, borrowed, with due acknowledgment, from Dr. Leonard Stejneger.

Of the ducks, however, Dr. Guillemard tells us one thing; a new way of cooking them *à la kamschatkaine*, which he recommends:—"The bird is plucked with care, so as to leave the skin unbroken: and is not drawn. A stick is thrust down the throat, and the other end stuck into the ground close to the fire. The effect produced when a party of a dozen are thus cooking their suppers is not a little absurd; it is as if the camp-fire had burst into a perfect girandole of naked ducks, who fly quacking from it in open-mouthed alarm." The party saw, but did not obtain, the fine sea-eagle of Pallas (*Thalassæetus pelagicus*). But the most interesting record of their journey to the naturalist is the notice of the strange and numerous Salmonidæ of the Kamschatkan rivers. The number of

these unhappy creatures is one of the marvels of nature. In a branch of the Avatcha 18 inches deep, "hundreds were in sight, absolutely touching one another; and as we crossed the river our horses nearly stepped upon them. * * They were for the most part foul fish * * *, but others in good condition were to be found, and with a little trouble I was able to pull out three good ten-pound fish in as many minutes with a gaff. Any other method of fishing would have been useless." A native present "went a little way up stream, and soon returned with half a dozen fish, which were a great improvement upon our own selection; for I can apply no better term to it. * * * The traveller goes down to hook his supper out of the stream as naturally as he gathers the firewood to boil his kettle."

The Kamschatkan population, human and canine, live chiefly on salmon, and during the summer so do the bears, and in winter horned cattle are foraged on them. This last curiosity in farming is known in some other countries, and we in India have seen milch and draught cattle fed on worse things. All the efforts of man, beast, and bird have no material effect upon the numbers of the fish, and the proportion consumed by all enemies is nothing to that which perishes from starvation, shipwreck, or disease, and lies in rotting heaps by the banks of almost every stream.

The commonest species is *Salmo Proteus*, *Kamschatkicè*, "Garbusa," which, says Dr. Guillemard, signifies "Hump-back," and certainly ought to. This fish starts in life with a good figure and a fine silvery complexion, set off by a few spots on his tail; but even before spawning his back begins to get humped, the natives say from the effect of his efforts in ascending the stream (which can scarcely be accepted as *causa vera et sufficiens*). At the same time his snout turns down and his chin turns up, and as a "kelt" he is the very Punch of the waters, while his coloration, livid, irregularly blotched with blood red, is rather that of a Clown. This is the most abundant species and least esteemed, thought eatable enough when "fresh run." It is chiefly used to feed dogs (and sometimes cattle), and runs to about 15 lbs. weight.

The largest and best fish is the "King Salmon," or "Tchervitchi," which attains a length of four feet and a weight of 50 or 60 lbs. *avoirdupois*, and is said sometimes to exceed these dimensions.

Dr. Guillemard mentions several others, and is rather perplexed about one, called Gultzi, which appeared to him to be a large char. The name is ascribed by several writers to a true Salmon (*S. callaris*), and is probably loosely applied by the natives to two or more species. One Kamschatkan Salmon (*Onchorhynchus lagocephalus*) turns bright red all over in the "kelt" stage, *i. e.* after spawning. Another, the "Kisuchi." (*Onchorhynchus Sanguinolentus*), is so fat that the natives "try out" the oil by putting heaps of the fish in a canoe beside a bonfire, with water *quant. suff.*, and dropping red hot stones in till the water boils and the oil rises to the surface. The civilization of this Russian dependency must be rather low when the inhabitants are reduced to this very primitive sort of cauldron close to navigable rivers.

The "Marchesa's" shore-party made a survey of the chief of these, the Kamschatka, and recorded some observations about the fine group of volcanoes near its

mouth, very well worth reading, and well illustrated from their photographs. The ship dared not cross the dangerous bar, though a Swedish schooner drawing 10' 6" had lately done so with some danger, bumping once or twice, even at high water. "It appears," says Dr. Guillemard, "that there is only one tide here in the 24 hours," a thing about which a seaman would like more positive information. The "Marchesa," however, had had enough of the place, got her "liberty-men" on board, and stood away for "Bering" Island.

Dr. Guillemard tells us that this, and not "Behring," is the proper spelling of the name which that unlucky navigator has left to the island in question, as well as to the more famous straits. It and a neighbouring one called "Copper Island" are the westernmost of the volcanic Aleutian chain that locks in the north angle of the Pacific. These two belong to Russia, and are called, together, the Komandorski (Commander) Islands, that having been the naval rank of poor Bering when he perished miserably on the larger, half-buried before the breath was out of him.

Most of the time of the "Marchesa's" party was taken up in interviewing the fur-seals, or sea-bears (*Callorhinus ursinus*); but the natural history of this animal, and the fashion in which he is preserved and slaughtered, are not only hackneyed, but in many details little short of disgusting. One thing Dr. Guillemard records which is not in the newspaper accounts of the Sealery, *videlicet*, the young sea-bears are born with their eyes open. Also he met here Dr. Leonard Stefneger engaged on the natural history of the islands. The most valuable result of his researches had been the collection of many bones of the extinct sea-cow (*Rhytina Stelleri*), and of some data bearing on the very recent colonization of these volcanic isles by the continental fauna and flora. He thought that the evidence quoted by Nordenskiöld as to the survival of *Rhytina* to within late generations was untrustworthy.

From Nikolsky, the capital of Bering Island, the "Marchesa" sailed to Cape Shipunsky, in Kamschatka, to hunt walrus and wild sheep (*Ovis nivicola*); with the former she did little good, the shore having been harried by the Swedish schooner already mentioned, and the carcasses left lying on the rocks, effectually debarred the survivors from landing. Now walrus hunting *in the water* is no diversion for amateurs. With the sheep the landed party did better, surrounding many on a lofty promontory, where they shot or drove over the cliffs no less than nine in one day. These sheep closely resemble the American "Bighorn" (*Ovis montana*), and are fine brutes, some exceeding 40 inches at the shoulder, with a length of five feet and a half, and horns 35 inches long outside the curve.

Dr. Guillemard gives reasons for maintaining the distinction of the species, by some identified with the nearly allied *O. montana*. They have one merit considerable in a sheep, very good mutton. A few seals, resembling *Phoca vitulina*, were shot here, after which the "Marchesa" returned to Petropalousky, and sailed thence to Cape Lopatka to get sea-otters (*Enhydra lutris*). They got two skins, and the canoe, bow and arrows used in the chase of this rare animal. The canoe was like an Esquimaux kayak in form and construction, made of skins of the sea-lion (*Eumetopias*) on a wooden frame, covered in, and further protected by a loose petticoat-shaped circular apron tied under the arms of the paddlers. One

of these canoes can be lifted with one hand (though they hold three men); and in foul weather (as they always cruise in company) they are made fast to each other by means of paddles seized down athwartships, forming a pretty sea-worthy sort of catamaran.

The bow is mentioned as of "tough wood," nn-named, strengthened by an outer longitudinal bracing of plaited hide such as is used by the tribes on the American coast of the same sea to *make up for the want of toughness* in the coniferous woods on which they have to depend. The arrow is of wood, with a long socket of walrus ivory, which loosely holds a barbed copper head, made fast to a lanyard of plaited sinew coiled on the shaft, very much as in the fishing arrows of our own Bhils. The feathers are "rifled," i.e., set on spirally to give a spinning motion to the projectile; a practice which is reported to exist, or to have existed, amongst some tribes in the north-east of the Indian peninsula.

From this point Dr. Guillemard, with his usual discretion, gives us a mere précis of the "Marchesa's" movements in well-known waters, till we rejoin her at anchor off Lamery, in the isle of Luzon, 40 miles south of Manila. Near this place is the lake of Taal, mountain-girt, and probably an extinct crater, 15 miles long. In its centre rises a mountainous island 2,000 feet high, on the top of which is an undoubted crater-lake a mile across. The "Marchesa" stayed only a few hours, and sailed for the Sulu sea. Passing the little isle of Bancoran, it was observed to swarm with big white "nutmeg pigeons" (*Myristicivora bicolor*), which tempted the travellers in vain. Time pressing, they proceeded on their voyage to Cagayan Sulu. This island lies pretty well in the centre of the Sulu sea and clear of the other islands known by the same name; it acknowledged the suzerainty of the Sultan of Sulu, subject always to the necessity of submitting to that of Spain, whenever and so long as enforced by the arms of that power. This seems to have been the condition of politics throughout the Sulu group at the time of the "Marchesa's" cruise, viz., 1883.

Dr. Guillemard thought he had never seen a tropic island "more captivating than Cagayan Sulu." The party explored it for several days; especially a strange chain of three crater-lakes, side by side on the south coast. The sea has broken into the westernmost and largest lake, Jiwata; but the entrance is only about a cable's length across and 3 feet deep, though inside there is 55 fathoms. It is also partly barred by an islet, a remnant of the crater's rim. The other two lakes contain fresh water; and it is impossible to look at the plan and sketch, illustrating Dr. Guillemard's account of them, without hoping that a civilized engineer may some day have the chance of cutting through the coral barrier and lava-bar of Jiwata; and turning it into one of the sweetest little harbours in creation; with a good water supply close by. Until that happens, however, there is a good harbour available on the north coast, discovered by our voyagers, and somewhat prosaically christened by them "Yacht Bay." It has a sandy bottom, and 15 fathoms water; but is not further described in the work under review. "Animal life appeared singularly meagre" in the island; but they got a new *Mizornis*; a large and very rare fruit-pigeon (*Carpophaga Pickeringa*); and some better known birds. The mammals appear to be rats and one monkey, the "krah" (*Macacus cynomolgus*) a common Bornean species.

Here there is a gap in the narrative, which is practically resumed at Meimbun, in the island of Sulu proper. Here they made acquaintance with the Sultan, whose authority is apparently nominal, and with many birds, including a green parrot (*Tanygnathus burbidgei*), peculiar to the Sulu Isles; and an almost new sun-bird (*Cinnyris juliae*) discovered in Mindanao by the "Challenger's" party. A white cockatoo (*Cacatua hæmaturopygia*) has the under-tail-coverts and vent scarlet; a single rose-coloured feather forms its crest; and it is, says Dr. Guillemard, "perhaps the commonest bird." Fancy a country where "the commonest bird" owns such a figure and coloration as this cockatoo, *and is also good in pie!*

The Spaniards had a fortified port in the north of Sulu, which is marked by that name in our charts; but they called it Jolo. Either name is preferable to one now happily obsolete: "Soog."

It does not appear to be a pleasant place, and gentlemen walking outside the palisades without escort are apt to get their heads chopped off with a "parang." This is a common word and weapon throughout the Eastern Isles; but the Sulu pattern, which Dr. Guillemard figures, deserves special notice. It very much resembles a Ghorkha "kukri" out of curl; and still more the curious short sword shown in some of our Indian Buddhist paintings and sculptures; which has sometimes, owing to the indistinctness of the latter, been compared to the short broadsword of classic warfare.*

Besides their eternal war with the Spaniards, the natives of Sulu are engaged in continual local, tribal, and individual feuds; and our author thinks that most of them would die in their boots if they had any. All parties treated the "Marchesas" as neutrals and guests; but on one occasion one of them, probably mistaken for an "orang Castillan," (Spaniard) was actually stalked by a native with a "parang," whom, however, his countrymen undeceived and quieted. The principal wild mammal of the island seems to be the pig (species not noted); and the Sulus showed our voyagers good pig-sticking. Of game birds they seem to have noticed chiefly *Gallus bankiva*, (the universal Jungle-cock of the farther east and probable ancestor of our Game fowls) and *Excalfactoria chinensis*, which Dr. Guillemard calls a button-quail; wrongly, of course, (if he has rightly identified his bird) *E. chinensis* is the "Blue-breasted Quail" of Indian sportsmen; our button-quails belonging to the genus *Turnix*, which has no hind toe; and as these names were adopted by Jerdon, whose English nomenclature was as systematic as his Latin, they have a right to stand. If size was the only thing to consider, *E. minima*, the Dwarf-Quail of Celebes, would put both the Indian birds, as well as the present species, out of court. It is the smallest game-bird in the world. Speaking generally, our voyagers found the fauna of the Sulu group to be Philippine in character, and Dr. Guillemard attributes to the Sihutu passage, separating them from Borneo, an importance, as a Zoological boundary little inferior to that of "Wallace's" line at the Lombok Strait, at the other side of the Malayan region.

* *Vide* for instance plate 37 of Fergusson's Indian and Eastern Architecture; representing a relief from Amrawati; and note that Amrawati was in constant communication with the Malay Islands.

From Sulu the "Marchesa" sailed to the territories of the British North Borneo Company, Brunei, and Sarawak. They were not able to visit the caves where the edible swallows-nests are procured in such quantities as to form "by far the most important" export of the country. Dr. Guillemard notes, however, that the caves are not the only habitat of this swallow. He "observed a couple of nests built close together on the face of a small cliff, barely 10 feet from the sea-beach." He does not name the species, and no bird of the genus (*Collocalia*) appears in his appendices. The party collected many birds, and a live ourang-outang, but met with no particular adventure in Borneo, except that our author found a bird as big as a goldfinch (*Mixornis Bornensis*) caught in the web of a forest spider (*Nephila*) who, "though evidently somewhat deterred by his unusually large capture and the violent shakings of the web, showed no intentions of flight, and quietly watched the issue of events close by." The masculine gender is perhaps here misplaced. It is probable that no *male* spider, even of the monstrous genus *Mygale*, which Dr. Guillemard found reaching 3" by 1" in size, could kill a bird. The female is the bigger, as well as better, half, among the *Arachnidæ*; and in some species carries woman's rights so far as to kill and eat her undesirable admirers.

After some cruising in known waters the "Marchesa," on the 9th August, anchored off Sumbawa; and entered on the study of the Australo-Papuan region, to which that island belongs by climate and zoology, though the population is of the Malay breed. The difference in landscape struck the travellers at once, everything was dry, the jungle scrubby and thorny, and *Euphorbias* of two or three species were abundant. In Bombay we don't require to go to the Papuan region for these luxuries; but Dr. Guillemard had been for months in Malay proper, and had come to feel that nothing but a rattan had any business to stop his way with prickly branches. "The forest trees were unfamiliar, and owing to the leaflessness of many of them, there was a remarkable absence of colour in the landscape. Here and there only a *Bombax* caught the eye; its crimson flowers conspicuous at the end of the bare branches. The prickly-pear was growing everywhere, and to judge from its abundance, must have been introduced into the island many years ago. No rain had fallen for five months, and the heat and dust were intolerable." From the above quotation it will be gathered that the glories of Sumbawa are pretty much such as may be enjoyed by the aid of the G. I. P. R., and without getting out of range of ice and pomplets.

The birds, however, were a little more interesting from the mixture of Indian and Malayan forms; and one new bird, *Zosterops Sumbavensis*, was obtained. At Bima, in this island, the best shooting was about the town graveyard.

From Sumbawa the "Marchesa" sailed to Gunongapi (or fire-mountains), a volcanic isle, where her collectors secured a new button-quail (*proper*) which they called *Turnix Powellii*, after one of their party. They also noticed a species of *Borassus*; not so common, says Dr. Guillemard, in the islands further west, which flowers but once, and dies immediately afterwards, like the bamboo and some other big endogenous plants.

From Gunongapi they sailed for Macassar in Celebes, where they found "dress-coats *de rigueur*, but a frock-coat or even a cut-away may be worn without

a breach of decorum." This compendium of Macassarian costume is, as Mr. Mathew Arnold would say, slightly wanting in lucidity; and our author saw nothing of the "incomparable oil, Macassar," which is reported to be made of the fruit of a tree very common about Bombay, the "horse-radish tree" (*Moringa pterygosperma*, Marathicè *Shewga*).

If there is no oil, however, there is lots of grog; "Port, Madeira, Hollands, and Bitters," and Manilla cheroots abound. "The ladies are far in advance of their Anglo-Indian sisters"; for why, because they wear "sarongs" and "Kibayas," things which the present writer fears to discuss. But from the context it would seem that if the Holland-Indian sisters *advance* much further on this line, their progress will be something like that of the Irish sergeant's squad "advance three steps backward, and dress by the gutter"; a dressing-room appropriate enough to any further change of costume in the direction indicated.

Amongst the Batavian disciples of Pantagruel and Lady Harborton Dr. Guillemard picked up a new trick in his own trade, a prophylactic against cholera; which at any rate, sounds pleasanter than our old friend Mr. Hornaday's "fever-cure" based upon strychnine at the rate of two ounces a week). "Float your liver, sir, keep your liver constantly floating in champagne," was the prescription of those whom our author naturally calls "the wise Dutch."

He might also well call them the liberal and hospitable Dutch; and they lent the "Marchesa" good charts, the height of friendship amongst seamen. She naturally, cruised a good deal about Celebes, and Dr. Guillemard admired the Dutch colonial system, and compared it with English ways, which he considers inferior. Leaving his generalisations on subjects clearly beyond his competence, it is a pleasure to accompany him on his proper ground—amongst the birds. In Celebes these are numerous and interesting, few more so than a dwarf dove (*Ptilopus melanocephalus*), one of many such in the Papuan region, but distinguished by shining green body and French grey head; velvet black nuchal patch, bright yellow throat and vent; and under tail coverts of crimson. He also procured *Prioniturus platurus*, a racket-tailed parrot, of a genus peculiar to Celebes and the Philippines, and on the small island of Talisse two fine species of fruit pigeons (*Carpophaga*) in which he noted the enormous power of gape (due to the peculiar arrangement of the mandibles and quadrate bones) which enables these birds to swallow entire fruits much bigger than their own heads. Returning to the main island of Celebes, the "Marchesas" shot some Babi-rusas, strange pigs whose extraordinary hornlike development of the upper canine teeth has earned their Malay name. "*Babi*" means a pig in Malay; and "*Rusa*" a deer. The latter word we have adopted into scientific Latin as the name of a genus of which the first specimens came from Malayana; though its finest species, the Sambar, is Indian.

They also got some pigs of a species unnoted, and had a great hunt for "Maleos," i.e., Megapodes, or "Brush-turkeys" (*Megacephalon maleo*). These birds, which sometimes weigh over $3\frac{1}{2}$ lbs. lay their large eggs in the sand of the sea-shore, like turtles, at which operation our sportsmen surprised them, and found that if they

* The natives asserted that the Babirusa could ascend trees (easy trees of course) and the "Marchesa's" hunters actually saw one try to do so.

advanced with great speed and demonstration the poor "turkeys" flew into trees and sat there to be shot down in succession. But if slowly approached they ran off into the jungle before giving a shot. The genus is Australo-Papuan, and Dr. Guillemard agrees with Mr. Wallace in considering its extension to the Nicobars as due to human agency. Another westernmost form was a brush-tongued lory (*Trichoglossus ornatus*). The genus is strong in Papua and Australia; and one species (*T. pumilus*) is one of the various "love birds" of our aviaries.

The party procured two specimens of the Sapi-utan (*Anoa depressicornis*), which is not a monkey, but a forest-bull (as the Malay name implies); and left Celebes for Ternate. Here, in the aviary of a Dutch District Officer, they were introduced to many Papuan birds which, at a later period of the voyage, they were to see at liberty.

One of the strangest of these was the heavy Black Cockatoo (*Microglossus aterrimus*) the only bird whose beak is strong enough to crack "kanari nuts"; and another the strangely vulturine parrot *Dasyptilus Pecqueti*. There were birds of Paradise too, but no reviewer has space to quote the eloquence with which the sight of these lovely creatures alive inspires the dullest traveller.

From Ternate the "Marchesa" sailed to Batchian and Obi; where the thing best worth mentioning, perhaps, was a racket-tailed king-fisher (*Tanysiptera obiensis*). It is strange how this peculiar form of tail-feather hangs about the skirts of the Malayan region, occurring in birds of very various diet and habit, from India to New Guinea. Another bird peculiar to the group, *Lorius, flavo-palliatus*, was shot while feeding on wild figs. It is "crimson and olive, with a splash of golden-yellow in the centre of the back," whence the name. The Malay hunters carry valuable spoil of this sort slung across their breasts, a good plan, as a light bird so carried would probably suffer little damage to its feathers.

On a small island called Bisu they obtained the Nicobar pigeon (*Calœnas Nicobarica*) which, says Dr. Guillemard, is generally distributed, yet rare, in the Eastern Isles. Its somewhat helpless bulk and terrestrial habits (in accordance with which its appearance is very gallinaceous) induce it to prefer remote islets unfrequented by man and other predatory mammals.

In this group they got their first birds of Paradise, the "Standard-wing" (*Semioptera Wallacei*); the only Paradiseid found out of the Papuan Islands, as restricted, and extremely aberrant from the rest of the family.

They also assisted at a deer-hunt, which seems to have been a scramble of many men and "pie" dogs: and saw sago being made.

On leaving Batchian, they touched at the desolate Weda Islands to shoot Nicobar pigeons, and saw none, but got many other pigeons, including *Carpophaga Myristicivora* "hitherto supposed to be confined to New Guinea and the true Papuan Islands" (page 247) and described as of "shining green plumage." It is not to be confused with *Myristicivora bi-color*, mentioned on page 2 of the same volume, which is mostly white and Bornean in habitat. They got a new red lory (*Eos insularis*); and a fine coloured plate of him is the frontispiece to the second volume. But the Weda isles have no anchorage, and the party had to re-embark, and sailed for the New Guinea group. Here they remained until December, collecting birds of Paradise chiefly; and other things too numerous to mention, and then returned home by way of Sulu.

The book is throughout extremely interesting; and about as well got up as any book of its size and class has ever been. Many of the illustrations are extremely beautiful, especially the studies of trees. There is a double-barrelled sketch of jack fruit (*Artocarpus integrifolia*) at page 6 of the second volume; which for truth and beauty is very much to be preferred to the living fruit; and has the further advantage of not smelling nasty, as that does.

There is but one thing to regret about "the Cruise of the Marchesa," *videlicet*, that none of the ship's company seem to have thought it worth while to notice any fish which did not lend itself to being "selected" with a gaff out of half a yard of water, except by eating it.

PROCEEDINGS.

List of contributions acknowledged at the Meeting held on 10th January 1887 omitted in the last number:—

Contribution.	Description.	Contributor.
2 Birds of Paradise	<i>Paradisea apoda</i>	H. H. the Maharaja Holkar.
1 Monkey (alive)	<i>Macacus radiatus</i>	Mr. A. S. M. Ritchie.
1 Manura (alive).....	<i>Paradoxurus musanga</i>	Do.
Shark Jaws	Bombay Harbour	Mr. Higgins.
A Manaul Pheasant	From Simla	Mr. H. W. Barrow.
6 Snakes	From the Dangs.....	Mr. F. Gleadow.
30 Lizards	Do.	Do.
1 Hamadryad	<i>Ophiophagus elaps</i>	Capt. A. Gwyn.
Birds' Eggs	From Shevaroy Hills	Mr. Mahon Daly.
1 Octopus (alive)	<i>Octopus vulgaris</i>	Mr. H. Killen.
2 Snakes	From Alibag	Mr. W. F. Sinclair, C. S.
3 Bats	Do.	Do.
1 Dolphin.....	<i>Sotalia plumbia</i>	Do.
3 Snakes	From Perim Island	Capt. W. Aves.
Scorpion and Centipedes ...	Do.	Do.
A large collection of Fish ...	From the Red Sea	Do.
A collection of Butterflies...	.....	Col. C. Swinhoe.
3 Eagles	From Afghanistan.....	Mr. J. A. Murray.
2 Snakes	From Persian Gulf	Do.
A collection of Plants.....	From Scinde	Do.
1 Cockatiel .....	.....	Victoria Gardens.
1 Gazelle	<i>Gazella Bennetti</i>	Do.
A collection of Plants.....	From S. India	Mr. F. Murray.
1 large Turtle	<i>Chelonia Virgata</i>	Mr. J. C. Anderson.
1 Red Parrot	From Singapore.....	Mr. M. Hakim.
2 Snakes .....	.....	Mr. F. Kirby.
1 Snake	From Kennery Island	Mr. W. F. Sinclair, C. S.
A quantity of Coralines and Marine Animals.	From Alibag	Do.
2 Jackals' Heads with Horns	.....	Mr. F. N. Davur.

MINOR CONTRIBUTIONS.

From Captain Raffin, Captain Street, Mr. F. Kirby and Captain Gissin, R. N.

CONTRIBUTIONS TO THE LIBRARY.

Magazine of Natural History, Vol. XVIII., Nos. CVII. and CVIII., from Mr. H. Littleddaie; Two Years in the Jungle (Hornaday), from Captain Connop; Useful

Plants of the Bombay Presidency (Dr. Lisbca), from the author; Journal of Comparative Medicine and Anatomy, Vol. I.; Journal of the Brookeville Society of Natural History, Nos. I. and II.; and Proceedings of the Linnæan Society of N. S. Wales, Vol. I., Part III.

List of contributions acknowledged at the Meeting held on 7th February 1887. omitted in the last number :—

Contribution.	Description.	Contributor.
1 Coco-de-mer.....	Lodoicea Seychellarum ...	Capt. A. Moore, R. N.
1 Bird of Paradise	Paradisea apoda.....	Mr. Jamsetjee C. Jamsetjee.
3 Flamingoes	Phœnicopterus roseus	Victoria Gardens.
2 Tortoises (alive)	Testudo elegans.....	Mr. W. S. Price.
Ceylon Leaf Insects	Mantis ficcifolia.....	H. E. Rear-Admiral Sir Fred. Richards.
1 Snake	Lycodon Anlicus	Mr. F. Kirby.
A quantity of Shells	From the Andamans	Sergt.-Major Wobb.
1 large Chameleon (alive)...	Chameleo vulgaris .....	.....
1 Wolf (alive)	From Aurungabad	Mr. F. Rose.
2 Owls (alive)	From Neemuch.....	Capt. M. B. Salmon.
Fresh-water Sponges	From Kurrachee	Mr. J. A. Murray.
1 Rock-horned Owl (mount- ed).	Bubo Bengallensis.....	Do.
A quantity of Butterflies ...	From Raipur, C. P.	Mr. J. A. Betham.
A number of Bats	From Sholapur	Mr. H. T. Silcock, C.S.
Carolines	From Bombay Coast.....	Mr. Framjee N. Davur.
A collection of Shells	80 Specimens	Miss Etta Sterndale.

MINOR CONTRIBUTIONS.

From Mr. C. E. Crawley, Mr. W. W. Squire, Mr. F. D. Parker and Mr. W. J. Essai.

CONTRIBUTIONS TO THE LIBRARY.

Magazine of Natural History, Vol. XIX., No. CIX. Mr. H. Littledale.

List of contributions acknowledged at the Meeting held on 7th March 1887 omitted in the last number :—

Contribution.	Description.	Contributor.
A collection of Sea Shells ...	150 Specimens	Mr. G. A. Kittredge.
1 Stinging Bay	Trygon Uarnak	Mr. F. A. Little.
1 Cobra (alive)	Ptyas mucosus	Victoria Gardens.
1 Four-horned Antelope ...	Tetraceros quadricornis ...	Do.
2 Young striped Hyæna (alive)	Hyæna Striata, from Am- raoti.	Rev. R. W. Metcalfe.
A quantity of Fish and Ma- rine Animals.	From Alibag	Mr. W. F. Sinclair, C. S.
1 Mounted Head of the Tahr.	Hermitragus Jemlaicus ...	Mr. H. Bicknell.
A quantity of Shells .....	.....	Do.
1 Kite (alive) .....	.....	Mr. J. S. Agran.
1 Snake's Skin	Daboia elegans	Mr. G. F. Sheppard, C. S.

MINOR CONTRIBUTIONS.

From Mr. R. Baumbach, Captain Bishop, Mr. V. St. J. Cabral, Mr. J. C. Anderson, Mr. H. E. Andrews and Mr. R. Hemming.

CONTRIBUTIONS TO THE LIBRARY.

Bulletin of the California Academy of Science, Vol. II., No. V; Record of the Geological Survey of India, Vol. XX.; Verhandlungen des Zoologisch Botanischen Gesellschaft in Wien XXXVI., Band III. IV. Quartal; Journal of Comparative Medicine and Surgery, Vol. II., No. I.; Life of Frank Buckland (Bombay), by Mr. E. C. K. Olivant, C.S.; Sport in India (Aberigh-Mackay), by Mr. J. A. Murray; Annals and Magazine of Natural History, by Mr. H. Littledale.

EXHIBITS.

Mr. G. W. Vidal, C. S., sent a collection of snakes on loan, consisting of 40 specimens; Mr. E. L. Barton exhibited a rug made by him out of 15 Afghan fox skins.

Mr. H. M. Phipson announced that through the generosity of a dozen of the members, the Society had been able to purchase, for the sum of Rs. 150, the splendid pair of *Ovis Polii* horns which had been exhibited in their rooms.

The usual monthly meeting of this Society was held on Monday, the 4th April 1887; Dr. D. MacDonald presiding.

The following new members were elected:—Major R. C. Graeme, Mr. R. A. Willis, Mr. A. J. Haslam, A.V.D., and Mr. B. W. O. Thompson.

Mr. H. M. Phipson, the Honorary Secretary, acknowledged the following contributions to the Society's collections:—

Contributions during March 1887.

Contribution.	Description.	Contributor.
60 Birds' Skins	From Dharangaon.....	Mr. G. Hampton.
1 Rock-horned Owl (alive).	From Hurda, C. P.	Mr. B. W. O. Thompson.
A collection of Birds' Eggs.	392 Specimens	Mr. H. M. Gibbs.
1 Double-barrelled Rifle by Daw.	Originally made for Major John Jacob. C B.	Do.
1 Bat	From Mozambique	Capt. Frohawk.
A quantity of Corals	From the Laccadives	Mr. M. C. Turner.
1 Ostrich .....	.....	Victoria Gardens.
1 Black Buck .....	.....	Do.
1 Monkey .....	.....	Do.
1 Indian Screech Owl (alive)	<i>Strix Javaica</i>	Mr. J. Malcolm.
20 Crocodile Eggs	<i>Crocodilus Palustris</i>	Mr. E. L. Barton.
Several Snakes .....	.....	Col. Kincaid.
1 Snake	<i>Chersydrus Granulatus</i> ..	Mr. T. Bromley.
2 Sambar Heads.....	.....	Mr. E. T. Leitch.
3 Snouts of Saw Fish.....	<i>P. Antiquorum</i>	Do.
1 Snake	<i>Tropidonotus Plumbeicolor</i> .	Dr. Gaye.
1 Owl (alive)	<i>Strix Javaica</i>	Mr. C. F. Davar.
4 Young Dolphins	<i>Neomeris Kurachicusis</i> ...	Mr. W. F. Sinclair, C.S.
A quantity of Fish and Marine Animals.	From Alibag	Do.
A quantity of Lizards, Snakes and Scorpions.	From Burmah	Mr. A. T. Webb.
1 Fish (mounted)	<i>Barbus Malabaricus</i> (16½ lbs., caught at Poona).	Mr. H. M. Phipson.

MINOR CONTRIBUTIONS.

From Mr. H. T. Hatch, Captain F. B. Peile, Mr. H. Toctill and Mr. Percy Benn.

EXHIBITS.

Mr. E. L. Barton exhibited 3 heads of Sambur, Neilghai and Panther, mounted by him for members of the Society up-country. Mr. H. Bicknell also exhibited a handsome rug made of the skins of the Silver Fox.

CONTRIBUTIONS TO THE LIBRARY.

Journal of the Asiatic Society of Bengal, Vol. IV., Part II., No. IV.; Proceedings of the Linnæan Society of N. S. W., Vol. I., Part IV.; Notarisia (of Venice) Nos. I to V.; Magazine of Natural History, Vol. XIX., No. III., from Mr. H. Littledale

In the place of the ordinary monthly meeting, on 2nd May 1887, an exhibition of *orchids, lilies, begonias and other choice plants* was held.

The following are the names of the Exhibitors:—

Mr. W. J. Best.	Hon. Mr. Justice Birdwood.
Mrs. Douglas.	Mrs. Chambers.
Mr. A. S. Panday.	Victoria Gardens.
Mr. M. C. Turner.	Mr. Furdoonjee Merwanjee Barajee.
Mr. J. K. Johnson.	Mr. N. S. Symons.
Mr. Chubildas Lulloobhoy.	Mrs. Grattan Geary
Mr. Cowasjee Dady Limjee.	Mr. L. R. W. Forrest.
Mr. D. M. Slater.	Mr. H. Knott.
Mr. Walter Lang.	Mr M. R. Wyer.

THERE WAS NO MEETING IN THE MONTH OF JUNE.